IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

AGERE SYSTEMS, INC.,	:	
Plaintiff,	:	**CIVIL ACTION**
	:	
v.	:	
	:	
BROADCOM CORPORATION,	:	**No. 03-3138**
Defendant.	:	

MEMORANDUM & ORDER

Schiller, J. **July 20, 2004**

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This case involves allegations of patent infringement relating to sixteen patents spanning four technological areas.[1] On May 6, 7, and 19, 2004, the Court heard testimony and argument regarding the parties' proposed claim constructions pursuant to *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995) (en banc). The Court now construes the claims at issue as set out below.

I. LEGAL BACKGROUND

A. GENERAL PRINCIPLES OF CLAIM CONSTRUCTION

The construction of patent claims is governed by Federal Circuit precedent. *See* 28 U.S.C. § 1295. As described by that court, claim construction analysis begins with the words of the claim. *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298-99 (Fed. Cir. 2003); *Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to particularly point out and distinctly claim . . . his invention."). These words are examined through the lens of "what one of ordinary skill in the art at the time of the invention would have understood the term to mean." *Markman*, 52 F.3d at 986; *see also Tegal Corp. v. Tokyo Electron Am., Inc.*, 257 F.3d 1331, 1342 (Fed. Cir. 2001). In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by a

[1] U.S. Patent Nos. 5,420,599 (the "'599 patent"), 6,175,550 (the "'550 patent"), 6,563,786 (the "'786 patent"), 6,014,705 (the "'705 patent"), 6,374,311 (the "'311 patent"), 5,740,366 (the "'366 patent"), 5,940,771 (the "'771 patent"), 4,990,802 (the "'802 patent"), 5,512,817 (the "'817 patent"), 4,477,782 (the "'782 patent"), 5,396,195 (the "'195 patent"), 6,011,432 (the "'432 patent"), 6,424,194 (the "'194 patent"), 4,941,154 (the "'154 patent"), 5,329,551 (the "'551 patent"), and 5,694,519 (the "'519 patent").

person of ordinary skill in the art. *Brookhill-Wilk 1*, 334 F.3d at 1298.

After examining the claim terms themselves, there are at least four other sources to which courts may look for analytical assistance. First, a court may consult the surrounding words of the claim to provide contextual indications of the meaning of a disputed term. *Id*. at 1299. Second, the written description must be examined in every case because it is relevant both to claim construction analysis and to determining if the presumption of customary meaning is rebutted. *Id*. at 1298; *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term."). Third, the prosecution history "is often of critical significance in determining the meaning of the claims." *Vitronics*, 90 F.3d at 1582. Finally, a court may take into account extrinsic sources such as dictionaries and expert testimony, provided that these sources are used to explain ambiguous claims rather than to vary or contradict unambiguous ones. *See Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1212 (Fed. Cir. 2002); *Brookhill-Wilk 1*, 334 F.3d at 1298.

The presumption in favor of ordinary meaning will be overcome where the patentee, acting as his or her own lexicographer, has clearly set forth a definition of the term different from that meaning. *Int'l Rectifier Corp. v. IXYS Corp.*, 361 F.3d 1363, 1373 (Fed. Cir. 2004). The presumption also will be rebutted if the inventor has clearly disavowed or disclaimed the scope of coverage by using words or expressions of manifest exclusion or restriction. *Teleflex, Inc. v. Ficosa North Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002).

B. MEANS-PLUS-FUNCTION TERMS UNDER 35 U.S.C. § 112 ¶ 6

"Means-plus-function" claim terms governed by 35 U.S.C. § 112 ¶ 6 (hereinafter "¶ 6") are construed using a different method than other claim terms. Paragraph 6 provides that if a claim term describes a "means or step for performing a specified function" without also stating the "structure, material, or acts" utilized to perform that function, the term is limited to the "structure, material, or acts" set out in the specifications that accompany the claims. *Id.* In other words, if a claim describes only a means of performing a certain function, without also describing a structure used to perform that function, the claim is deemed to encompass only the function as performed by the corresponding structures set out in the specifications. If ¶ 6 does not apply, the term is interpreted using ordinary claim construction principles. Thus, when construing a claim term that describes a means of performing a function, a court must first make the threshold determination of whether ¶ 6 applies.

Under Federal Circuit caselaw, if a term contains the word "means" there is a rebuttable presumption that ¶ 6 applies. *Micro Chem., Inc. v. Great Plains Chem. Co., Inc.*, 194 F.3d 1250, 1257 (Fed. Cir. 1999). The only way to rebut this presumption is to show that the claim text details sufficient "structure, material, or acts" to perform the claimed function. *Id*. Conversely, if a term does not use the word "means," there is a rebuttable presumption that ¶ 6 does not apply. *Id*. This presumption is overcome when the claim "relies on . . . functional terms rather than structure or material to describe performance of the claimed function." *Id*.

If ¶ 6 applies, a court must determine: (a) the function served by the term; and (b) the structure used to accomplish that function. *Nomos Corp. v. Brainlab USA, Inc.*, 357 F.3d 1364, 1367 (Fed. Cir. 2004). Regarding the first inquiry, "[t]he court must construe the function of a means-plus-function limitation to include the limitations contained in the claim language, and only

those limitations. . . . It is improper to narrow the scope of the function beyond the claim language." *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1113 (Fed. Cir. 2002) (internal citation omitted); *see also Micro Chem.*, 194 F.3d at 1258 ("The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim."). Regarding the second inquiry, the relevant structure is that which is "required for performing the claimed function" and which "the specification . . . clearly links or associates . . . to the function recited in the claim." *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1334 (Fed. Cir. 2004) (quotations omitted). "When multiple embodiments in the specification correspond to the claimed function, proper application of [¶ 6] generally reads the claim element to embrace each of those embodiments." *Micro Chem.*, 194 F.3d at 1259. The claim, however, "does not cover every means for performing the specified function." *Nomos*, 357 F.3d at 1368 (quotations omitted). "In order to qualify as corresponding, the structure must not only perform the claimed function, but the specification must clearly associate the structure with performance of the function." *Cardiac Pacemakers*, 296 F.3d at 1113. "This inquiry is undertaken from the perspective of a person of ordinary skill in the art." *Id*.

II. WIRELESS PATENTS

A. '599: ANTENNA APPARATUS

In small wireless modems, two antennae are often used to improve reception of radio transmissions. When two antennae are placed close together, however, there is often"coupling," or disturbance. The '599 patent addresses this problem with a switch that selectively connects one antenna to "ground," causing that antenna to be electrically shortened and thus changing its

frequency so that it operates at a "different" frequency from that of the active antenna.

1. "Grounded" (Claim 6)

The parties agree that this term should be construed according to its plain and ordinary meaning: "Connected to ground." (*See* Broadcom Resp. at 12; Agere Reply at 3.)[2]

2. "Different" (Claim 6)

Agere assents to the construction proposed in Broadcom's response brief: "Tuned to a frequency that is outside the operating frequency of the [first/second] antenna." (Broadcom Resp. at 13; Agere Reply at 4-5.)

B. '550: ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEM WITH DYNAMICALLY SCALABLE OPERATING PARAMETERS AND METHOD THEREOF

In orthogonal frequency division multiplexing ("OFDM") systems, information is transmitted at various carrier frequencies, often called sub-carriers. The frequencies are spaced so as to avoid interference with each other. The '550 patent allows wireless local area network ("WLAN") hardware operating in an OFDM transmission scheme to obtain the best combination of speed and accuracy in transmission. A device operating in this system can "dynamically scale," or adjust during operation, at least one operating parameter by "adaptively selecting one of a plurality of operating parameter scaling options." The system determines whether to make these adjustments on the basis of information received via a "feedback signal."

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[2] Although the parties' original briefs indicated an agreement on this construction, Broadcom submitted supplemental briefing after the *Markman* hearing in order to "crystalize[the] dispute" regarding the term "grounded." (Broadcom's Submission of Information Requested by the Court at 3 [hereinafter Broadcom's Submission of Requested Information].) To the extent that Broadcom's post-*Markman* submission suggests a new proposed construction of "connected to a ground plane" that is different from plain and ordinary meaning of "connected to ground," Broadcom has failed to offer any support from the intrinsic record for such a limitation.

1. "Feedback signal" (Claims 1, 15, 21)

The key issue raised by the parties' competing constructions of this term is whether the feedback signal must be an actual electronic signal, i.e., a series of bits, as Broadcom suggests, or whether the term may also include the absence of a signal, as Agere contends.

Review of the claim language clearly demonstrates that the term "feedback signal" must contain actual information. Claim 1 states that the feedback signal is "*receiv*[*ed*]" from a receiver, and that the determination of whether to scale an operating characteristic from a first to a second level must be "based on said feedback signal *received* from a receiver." ('550 patent, col. 10, ll. 64, 67 (emphasis added).) Claim 15 states that the feedback signal is "*generat*[*ed*] . . . based on said OFDM signal" and "*provid*[*ed*]" to "dynamic control circuitry." (*Id*., col. 12, ll. 8-10 (emphasis added).) It would be anomalous to speak of a device "receiving," "generating," or "providing" the absence of a signal. (*See* Cox Dep. at 128.) In fact, in response to direct questioning from the Court at the *Markman* hearing, Agere's counsel was unable, despite tenacious efforts, to explain how a receiver could "generate" the absence of a signal. (R. at 30-35 (May 7, 2004).)

Agere argues that one portion of the specifications supports its construction. This specification describes how the signal quality of a transmission line can be measured "by one of the following: received signal strength, received signal to noise plus interference ratio, detected errors (CRC), the presence of acknowledgments (lack of acknowledgments the link for communication signals is bad)." ('550 patent, col. 7, ll. 56-61.) Agere correctly notes that the non-parenthetical portion of the quoted language lists types of feedback that can be used by the dynamic control circuitry to assess transmission signal quality. (*See* Goodman Rep. ¶ 22.) The text within the parenthetical, however, does not also constitute a "feedback signal" as that term is used in the claim

language. Rather, it is an independent, albeit inarticulate, clause indicating that the lack of an acknowledgment may *also* convey information to the transmitter, i.e., that the link for communication signals is bad. Accordingly, this portion of the specifications does not alter the clear meaning of the term "feedback signal" as evidenced by the claim language.

Agere advances the additional argument that its construction is supported by dictionary definitions, specifically the definitions of "feedback" and "signal."[3] The Academic Press Dictionary of Science and Technology defines "feedback" as "the return of information about a system or process that may effect a change in the process."[4] ACADEMIC PRESS DICTIONARY OF SCIENCE AND TECHNOLOGY 812 (Christopher Morris ed., 1992). The Sixth Edition of the IEEE Standard Dictionary of Electrical and Electronics Terms defines "signal" as "a visual, audible or other indication used to convey information." (Goodman Rep. ¶ 20.) Agere combines these two definitions to arrive at its proposed construction: "An indication depending in part on an original signal." Agere's combined definition, however, does not resolve the key dispute noted above regarding whether an "indication" includes the absence of a signal. Agere merely asserts that the indication "could come in the form of an acknowledgment (indicating that the message was received

[3] Agere argues that it was necessary to examine the definitions of "feedback" and "signal" separately because, although the IEEE Standard Dictionary of Electrical and Electronics Terms defines the composite term "feedback signal" as it relates to "control system" applications, that definition does not comport with how the term is used by communications engineers in relation to OFDM transmissions. (Goodman Rep. ¶ 19.)

[4] Notably, Agere's expert's report utilizes the IEEE definition of "feedback," which is "the returning of a fraction of the output of the input." (Goodman Rep. ¶ 20.) Presumably, Agere abandoned this definition of "feedback" because, as Dr. Goodman admitted at the *Markman* hearing, it contradicts Agere's proposed construction. (R. at 6 (May 7, 2004) (noting that IEEE definition "required [an] electronic signal, an actual signal, not the absence of a signal . . . because [it] required returning a fraction of the original signal").)

by the receiver accurately) or the absence of an acknowledgment (indicating that the message was not received by the receiver accurately)." (*Id.* ¶ 21; Agere Opening at 24.) Neither the dictionary definitions nor Agere's combined definition, however, compels this conclusion. In fact, the IEEE Dictionary definition of "signal" cited above could be plausibly read to require an actual physical signal and the IEEE definition of "feedback" definitely so requires. *See supra* n.4. Furthermore, even if the dictionary definition of "feedback signal" includes the absence of a signal, that definition would be contrary to the clear import of the claim text.

In light of the foregoing analysis, the Court finds that the "feedback signal" must contain an actual electronic signal. Broadcom's proposed construction, however, includes the further limitation that a "feedback signal" is a "series of bits." Broadcom's only support for this language is its expert's assertion, which is unsupported by a dictionary definition or reference to the intrinsic record. (Broadcom's Resp. at 18.) Instead, the Court adopts the broader construction proposed at the *Markman* hearing: "An actual electronic signal constituting information about the communication environment which allows an originating source to adapt in response to that information."[5]

2. "Receiving an OFDM signal that includes OFDM symbols" and "Generating a feedback signal based on said OFDM signal" (Claim 15)

The original dispute over this term focused on whether a device employing the patented method must generate a feedback signal for *every* OFDM signal, as Broadcom contended, or whether the claim allows the receipt of multiple OFDM signals before a feedback signal must be generated, as Agere argued. In its response brief, Broadcom conceded this point by agreeing to modify its

[5] Broadcom indicated at the *Markman* hearing that it would be willing to accept this revised construction. (*See* R. at 41 (May 7, 2004) ("A signal means actually sending some electronic form of signal.").)

construction. Accordingly, the only remaining substantive dispute over this claim term concerns "feedback signal," which is construed as discussed above. Thus, the following construction is adopted: "The receiver generates a feedback signal by evaluating a received OFDM signal."

3. "Receiving [receives] a feedback signal from a receiver" (Claims 1, 21)

Again, the parties' only dispute concerns "feedback signal," and therefore the following construction is adopted: "A transmitting device receives a feedback signal from a receiving device."

4. "Adaptively selecting one of a plurality of operating parameter scaling options" (Claims 1, 21)

The central dispute concerning this term is whether it means choosing one of two or more sets of operating parameter options, each of which may differ from the other with regard to only one operating parameter, as Agere suggests, or choosing from two or more of the operating parameters themselves, as Broadcom contends.[6] At the crux of this dispute is the word "options." In order for Agere's construction to be correct, the word "options" must refer to sets of specified values of parameters.[7] In contrast, Broadcom construes the word "options" as referring to the operating parameters that can be scaled (i.e., symbol duration, guard time interval, number of OFDM carriers, and number of bits per symbol per OFDM carrier) and the value to which the selected parameter is scaled.[8]

Although each party argues that the plain language of the term and its surrounding claim text

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[6] Broadcom concedes that, under either construction, "only one operating parameter actually need be selected and scaled." (Broadcom Resp. at 27.)

[7] "[O]ur position is operating parameter scaling options is a set of values of various parameters." (R. at 72 (May 7, 2004).)

[8] "Your operat[ing] parameter options have two components. One is which parameter you change and the second is which value you adopt for that parameter." (R. at 76 (May 7, 2004).)

supports its construction, the Court finds that the claim language itself is ambiguous because it could be read to support either construction. The specifications, however, provide strong support for Agere's construction. *See Vitronics*, 90 F.3d at 1582 ("As we have repeatedly stated, [c]laims must be read in view of the specification, of which they are a part." (internal citation and quotations omitted).) The specifications include a table describing "parameter scaling options" exemplified by sets of fixed values for the various parameters. ('550 patent, col. 5, ll. 37-50.) This table "lists several *parameter options* for various scaleable transmission or data rates." (*Id.*, col. 5, ll. 32-33 (emphasis added).) In the text describing the table, the term "options" is used to describe sets of operating parameters consisting of given values for each of symbol duration, guard time, number of carriers, bandwidth, and raw data rate. (*Id*., col. 5, ll. 33-36.) Therefore, although the claim text does not provide clear content to the term "options," the specification demonstrates that "options" consist of sets of specified values of parameters. Accordingly, the intrinsic record supports Agere's proposed construction.

Broadcom attempts to refute this conclusion with evidence from the prosecution history, specifically arguments made by the applicant to distinguish the application from prior art. As originally filed, claim 1 taught "dynamically scaling at least one of said operating parameters for said method." (Broadcom Resp. Ex. E at 22 ('550 File History).) This broad claim was rejected by the Examiner in light of U.S. Patent No. 5,063,574 (the "Moose patent"), which "teaches a method for providing communication OFDM signals which comprises the step of dynamically scaling at least one of the operating parameters." (*Id*. at 44.) In response, the applicant amended claim 1 to add the limitation of "said dynamic scaling achieving a scalable operating characteristic by adaptively selecting one of a plurality of operating parameter scaling options." (*Id*. at 49-50.) While this

exchange itself does not provide substantive content to the word "options," Broadcom points to a statement in which the applicant writes: "To scale an operating parameter in response to changes in characteristics of the communications environment, one of a plurality of scaled operating parameter options (e.g., the number of carriers, symbol duration, number of bits per carrier, and guard interval) is selected." (*Id*. at 75.) Broadcom argues that this statement clearly equates "options" with parameters. As Agere points out, however, the very next page of the file history suggests just the opposite. While describing a figure in the specifications, the applicant writes: "[T]he dynamic control circuitry . . . may adaptively select an operating parameter scaling option having a relatively large guard time interval and large number of subcarriers to achieve the desired data rate while providing low delay spread tolerance." (*Id*. at 76.) This statement suggests that an "option" consists of a set containing values of multiple parameters and that this set may be selected to achieve a desired operating characteristic. Thus, the file history is ambiguous and therefore cannot overcome the construction suggested by the specifications. *See Oakley, Inc. v. Sunglass Hut Int'l*, 316 F. 3d 1331, 1345 (Fed. Cir. 2003) ("[O]ne vague statement from the prosecution history does not have much bearing on the meaning of [a] claim phrase . . . which [the Federal Circuit] derive[s] from the specification's clear teachings . . . .").

Agere also challenges Broadcom's inclusion of the following sentence in its proposed construction: "The choice of which operating parameter(s) to select cannot be predetermined." Broadcom claims that this statement, which is not found in any of the claim text, is necessitated by the claim term "adaptively." The problem with this language, however, is obvious given the Court's resolution of the first dispute. While the choice among parameter scaling *options* is "adaptively selected" in real time, and thus not predetermined, operating parameters themselves are not

"selected," as Broadcom's language would imply. (*See* '550 patent, Table 1, col. 5, ll. 37-50; *see also* R. at 80 (May 7, 2004) (Broadcom's counsel conceding that "[t]he numbers are predetermined. The options are not.").) Accordingly, the Court declines to add this further limitation. Therefore, the Court adopts the following construction: "Making a selection from among a set of options, each of which has different values for one or more operating parameters."

5. "Determining that an operating characteristic of said method should be scaled from a first level to a second level based on said feedback signal received from said receiver" (Claim 1)

This phrase is the source of four distinct disputes between the parties. For ease of analysis, the Court addresses each component separately.

a. "Determining that an operating characteristic of said method should be scaled . . . based on said feedback signal"

The first dispute is whether the decision to scale an operating characteristic must be based on only one feedback signal, as Broadcom contends, or whether it can be based on more than one feedback signal, as Agere contends. In the claim text, this dispute concerns the meaning of the phrase "said feedback signal" and its referent, "a feedback signal." Claim 1 is a method claim that recites three steps for "providing communication signals according to operating parameters" using OFDM. ('550 patent, col. 10, ll. 58-60.) The three enumerated steps are introduced in the claim language by the transition word "comprising" and generally consist of: (1) receiving a feedback signal; (2) determining that an operating characteristic should be scaled; and (3) dynamically scaling the operating characteristic. (*Id.*, col. 10, l. 64-col. 11, l. 8.) In method claims, the transition "comprising" is a term of art that indicates to patent practitioners that the claim is "open-ended and allows for additional steps." *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368 (Fed. Cir.

2003). Thus, when the "comprising" transition is used, steps beyond those recited in the claims may be performed. *Id*.

In claim 1, the first two steps in the method described consist of "receiving a feedback signal from a receiver" and determining that an operating characteristic should be scaled "based on said feedback signal." ('550 patent, col. 10, ll. 64, 66.) As claim 1 is a comprising claim in which steps beyond those recited may be performed, the system described may receive additional feedback signals before the second step, i.e., the determination to scale, occurs. Notably, however, the claim language states that the second step, i.e., the determination to scale, must be based on "*said* feedback signal." The singular form of the phrase "*said* feedback signal" in the second step and its referent, "*a* feedback signal" implies that although many feedback signals may be received by the receiver, only one feedback signal is the basis for the decision to scale.[9] *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1024 (Fed. Cir. 1997) (finding, in context of comprising claim, that "[t]his term itself, 'said chamber,' reinforces the singular nature of the chamber"); *see also N. Am. Vaccine, Inc. v. Am. Cyanamid Co.*, 7 F.3d 1571, 1575-76 (Fed. Cir. 1993) (acknowledging that patent parlance construes "a" to connote "one or more," yet holding that "there is no indication in the patent specification that the inventors here intended it to have other than its normal singular meaning").

At the *Markman* hearing, Agere argued that Broadcom's expert, Dr. Cox, admitted in his deposition that the determination to scale could be based on multiple feedback signals. (R. 58 (May 7, 2004).) In support, Agere quoted a portion of Dr. Cox's deposition in which he stated: "It could be more than one feedback signal, and each – well, if there is more than one feedback signal, the

[9] Agere agreed with this conclusion in its reply brief, stating that, "[a]ccordingly, the claim allows many other feedback signals to be used by the receiver. The claim merely demands that one of them be used as a basis for making a determination." (Agere Reply at 14.)

transmitter could evaluate more than one feedback signal." (Agere's Post-*Markman* Br. Ex. 2 (quoting Cox Dep. at 28-29).) The excerpt, however, does not lead the Court to the conclusion Agere suggests. In context, Dr. Cox is referring to Broadcom's proposed construction, which, in relevant part, states that "[t]he transmitter evaluates one feedback signal as it is received from a receiver, and based on that evaluation makes a decision that at least one operating characteristic . . . must be scaled." In other words, the transmitter can evaluate a feedback signal, or even several feedback signals, without making the determination to scale. Thus, Dr. Cox's admission that more than one feedback signal can be *evaluated* does not necessarily lead to the conclusion that the determination to scale an operating parameter, which, according to the claim language, is "based on *said* feedback signal," could be based on more than one feedback signal. Rather, as noted previously, the patent contemplates that, while multiple feedback signals may be received, only one feedback signal may be the basis for the decision to scale. Furthermore, Agere's own expert stated in his report that "one of ordinary skill in the art would understand that 'based on said feedback signal' means that the determination of whether the operating characteristic in question should be scaled is based, in part, on *the* feedback signal." (Goodman Rep. ¶ 13 (emphasis added).) Therefore, according to the claim language, although the transmitter may receive more than one feedback signal, the determination to scale an operating parameter must be based on one feedback signal.

b. "determining that"

The second dispute is whether there must be a scaling event after each evaluation of a feedback signal by the transmitter, as Broadcom contends. Broadcom's argument is based on a comparison of the language used in the "determining" step of claim 1 to that used in the "determining" steps of claims 15 and 21. Claim 1 teaches a transmitter "determining that an

operating characteristic . . . should be scaled," whereas the transmitters of claims 15 and 21 "determine[] whether" scaling should occur. ('550 patent, col. 10, l. 65, col. 12, ll. 11, 63.) According to Broadcom, the phrase "determining that" suggests that an affirmative decision to scale must occur after each feedback signal is received.

The Court rejects Broadcom's position. First, the conclusion that the evaluation of a feedback signal does not necessarily result in a scaling event is a necessary corollary of the Court's determination above that the transmitter may receive multiple feedback signals before the decision to scale occurs. Second, Broadcom's argument is belied by the claim language because the word "determining" itself suggests that, after the evaluation of a feedback signal, the system may either: (1) decide to scale; or (2) decide *not to scale*. (*See* Goodman Rep. ¶ 8 (citing Webster's II New College Dictionary definition of "to decide or settle").) Accordingly, the claim does not require that a scaling event occur after each evaluation of a feedback signal.

c. "from a first level to a second level"

The third dispute concerns whether the phrase "from a first level to a second level" should be construed to mean "from a current level to a second level," as Broadcom contends, or should not be construed at all, as Agere argues. The Court agrees with Agere that the plain language of this claim term is clear to both skilled artisans and laypersons alike. As Agere's expert stated, one of ordinary skill in the art "would understand 'first level' and a 'second level' to refer to two different levels, the 'first level' being the level of the operating characteristic before the operating characteristic is scaled and the 'second level' being the level of the operating characteristic after the operating characteristic is scaled." (*Id.* ¶ 11.)

Despite Dr. Goodman's explanation, which seems eminently logical to the Court, Broadcom

asks the Court to construe the phrase "first level" to mean "current level." Broadcom, however, fails to offer any specific support for its construction, merely stating, "[i]f the claimed 'first level' is not the 'current level,' what else could it be?"[10] (Broadcom Resp. at 35.) As there is no clearer way to define this claim term than the language of the claim itself, and as Broadcom has offered no support for its differing construction, the Court finds that the term does not need construction. *See, e.g.*, *W.E. Hall Co. v. Atlanta Corrugating, LLC*, 370 F.3d 1343, 1350 (Fed. Cir. 2004) (affirming district court determination that term "single piece" was "sufficiently clear to make even resort to the dictionary unnecessary"); *Applera Corp. v. Micromass UK Ltd.*, 186 F. Supp. 2d 487, 508 (D. Del. 2002) ("[Plaintiff] believes such a construction by the court to be unnecessary because 'a rod is a rod.' The court agrees and believes the proper construction of rod to be self-evident."); *ASM Am., Inc. v. Genus, Inc.*, 260 F. Supp. 2d 827, 850 (N.D. Cal. 2002) ("The Court agrees with [plaintiff] that there is no better way to define 'generally circular' than to simply say 'generally circular.' Accordingly, the Court declines to construe the term.").

d. "feedback signal"

The Court construes "feedback signal" as discussed above. *See supra* Part II.B.1.

e. Conclusion

The following construction is adopted: "Deciding whether an operating characteristic should be scaled from a first level to a second level based on the feedback signal from the receiver."

[10] In fact, Broadcom's expert, Dr. Cox, does not even address this term in his expert report.

6. "Generating a feedback signal based on said OFDM signal and providing said feedback signal to dynamic control circuitry that determines whether an operating characteristic of OFDM symbols should be changed based on said feedback signal" (Claim 15)

This phrase raises the same issues as discussed previously. Accordingly, and for the same reasons, the Court adopts the following construction: "The receiver generates a feedback signal based on a received OFDM signal and provides that feedback signal to control circuitry that decides whether at least one of the operating characteristics should be changed during operation based on that feedback signal."

7. "Said system comprising dynamic control circuitry which receives a feedback signal from a receiver, determines whether an operating characteristic of said method should be scaled from a first level to a second level based on said feedback signal" (Claim 21)

Again, this phrase raises the same issues as discussed previously. Accordingly, and for the same reasons, the Court adopts the following construction: "The transmitting device comprises control circuitry that receives a feedback signal from a receiving device and decides whether an operating characteristic should be scaled during operation from a first level to a second level based on that feedback signal."

C. '786: ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING SYSTEM WITH SELECTABLE RATE

The '786 patent is directed at methods of transmitting radio signals in an OFDM-based wireless network. Information is transmitted via radio waves in groupings called "symbols."[11] Often, the waves ricochet and "overlap" as they travel, causing undesired interference in the transmission, known as "noise." The '786 patent teaches that the amount of noise can be reduced

[11] Multiple symbols are often sent successively. (Agere Opening at 37.) In 802.11 systems, symbols are gathered together into larger structures called packets, or frames. (*Id*. at 37 n.27.)

by: (a) inserting a guard time interval between the transmission of subsequent OFDM symbols; and (b) employing "signaling modes" wherein the durations of both the "information-carrying symbol" and the guard time are multiplied by a certain integer. The '786 patent also describes an OFDM transmitter, which is comprised of, inter alia, a "prefix and window circuit."

1. "Information-carrying symbol(s)" (Claims 1, 7)

Neither of the parties claims that the phrase "information-carrying symbols" had a customary meaning in the field of OFDM technology at the time this patent was filed and neither purport to have found the phrase "information-carrying symbol" in a dictionary.[12] Accordingly, the Court looks to the intrinsic evidence, beginning with the claim language itself. *See Vitronics*, 90 F.3d at 1582.

The descriptive phrase "information-carrying" modifies the word "symbol" in the claim language. The parties' disagreement concerns how this modifying phrase limits the meaning of "symbol." Agere contends that the phrase "information-carrying" distinguishes between symbols and guard intervals.[13] (R. at 98 (May 7, 2004).) According to Agere's expert, Dr. Goodman, the term "symbol" alone may refer to both the guard time and the informational portion of the symbol

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[12] At the *Markman* hearing and in post-*Markman* briefing, Broadcom proffered the deposition testimony of Dr. Richard van Nee, the sole inventor of the '786 patent. (Broadcom's Submission of Requested Information at 4-6.) In his deposition, Dr. van Nee claims that the term "information-carrying symbol" did have a customary meaning to a person of skill in the art at the relevant time and that, in a "pure technical sense," that meaning excludes preamble symbols. (van Nee Dep. at 156, 159-60.) As two persons of skill in the art have testified that this term did not have a customary meaning and in the absence of a dictionary or other evidence supporting Dr. van Nee's testimony, the Court finds that this phrase did not have a customary meaning to a person of skill in the art at the relevant time. *E-Pass Tech. v. 3Com Corp.*, 343 F.3d 1364, 1370 n.5 (Fed. Cir. 2003) ("[T]his Court has often repeated that inventor testimony is of little probative value for purposes of claim construction."); *see also Markman*, 52 F.3d at 985 (noting that inventor's opinion regarding meaning of claim term is not accorded any added weight in claim construction).

[13] Guard intervals do not carry information that is used and therefore are purposefully ignored by the receiver. (Agere Opening at 41-42.)

together or to the informational portion of the symbol alone. (Goodman Rep. ¶ 58.) Therefore, the prefix "information-carrying" was added to the term "symbol" in this patent to narrow the patent's reference to the informational portion only. (*Id*. ¶ 58.) Dr. Goodman's argument, however, is belied by the claim language itself. Claim 1 describes a transmission scheme "wherein a guard time is interposed between successive ones of said information-carrying symbols." ('786 patent, col. 4, ll. 59-60.) As the claim language explicitly distinguishes between symbols and guard times, Agere's construction would render the "information-carrying" modifier superfluous. Thus, the phrase "information-carrying" could not have been intended to alleviate the ambiguity Agere suggests.

According to Broadcom's expert, Dr. Cox, the phrase "information-carrying" is used to distinguish between the data portion of the transmission and preamble symbols. Preamble symbols are symbols sent by the transmitter before the data, or "payload," portion of the transmission. They consist of known symbols, based on a mathematical equation set out in the 802.11a standard, that are used by the receiver to discern characteristics of the communication channel. (Goodman Rep. ¶ 54-55; R. at 95 (May 7, 2004).) The transmitter sends the preamble symbols to the receiver, which runs an algorithm that generates the same preamble symbols internally and then compares those generated symbols with the received symbols in order to discern whether the preamble was distorted as it traveled through the communication channel. (Goodman Rep. ¶ 54-55; Cox Dep. at 76; R. at 92-95 (May 7, 2004).) Once the receiver has determined whether there are distortions in the channel, it takes that distortion into account when evaluating subsequent receptions. (Broadcom Resp. at 43.) With this background in mind, Dr. Cox bases his construction on a technical dictionary's definition of the term "information," which is "knowledge or intelligence unknown to the receiver before its

receipt."[14] (Cox Rep. at 41-42 (citing Cambridge Dictionary of Science and Technology).) Because the preamble portion of the packet only contains known values used to discern the characteristics of the channel, and because "information" is "unknown to the receiver before its receipt," Dr. Cox concludes that it is axiomatic that the phrase "information-carrying symbols" does not include the preamble. (*Id*. at 42.)

The Court finds that Broadcom's proposed construction for the modifier "information-carrying" is consistent with the technical dictionary definition noted above and, unlike Agere's proposal, is also consistent with the use of the term in the claim language. Therefore, Broadcom's construction is adopted, with the exception of the reference to "packet," which is omitted for reasons described in the next section. *See infra* Part II.C.2. Accordingly, the following construction is adopted: "Symbol(s) containing data, but not preamble symbols."

2. "Signaling modes" (Claims 1, 7)

The key issue regarding this term is whether a "signaling mode" is always used to transmit a "packet of data," as Broadcom suggests, or whether this construction would constitute an improper limitation of the claim term, as Agere suggests. Broadcom's expert, Dr. Cox, admits that this claim term does not have a customary meaning in the field. (Cox Rep. at 44.) Furthermore, the term "packet" cannot be found anywhere in the claim language. Nonetheless, Broadcom draws support for its limiting construction from two sources.

First, as noted above, this patent describes the transmission of symbols of equal length.

[14] In support of its opposing construction, Agere cites the Academic Press Dictionary of Science and Technology definition: "data that are transmitted by signals via telecommunication channels." ACADEMIC PRESS DICTIONARY OF SCIENCE AND TECHNOLOGY 1107 (Christopher Morris ed., 1992). This definition, which defines information as data, appears to support either party's proposed construction.

According to Dr. Cox, a person of ordinary skill in the art at the time the '786 patent was filed "would understand packets of data to contain data symbols of the same length in the payload portion of the packet because in OFDM systems of that time, symbol and guard time lengths were not generally changed in the middle of the transmission of a packet of data." (Cox Rep. at 45.) This statement, however, employs questionable logic. Even assuming that a person of skill in the art would understand a "packet" to consist of data symbols of equal length, this does not compel the conclusion that a claim describing the transmission of data symbols of equal length must necessarily describe the transmission of a packet. Accordingly, the disputed claim term will not be limited on this basis.

Second, Broadcom draws support for its limitation from the description of the preferred embodiment in the specifications:

> In the preferred embodiment of the present invention, a first signaling mode (the 'normal' mode) uses signal length T, a guard time T_G and a set of N sub-carriers and a second mode (the 'fallback' mode) uses a symbol length KT, a guard time KT_G and the same set of N sub-carriers, where K is an integer greater than unity.

('786 patent, col. 1, l. 66-col. 2, l. 4.) According to Dr. Cox, one of ordinary skill in the art would understand the terms "normal mode" and "fallback mode" to refer to the transmission of an entire packet of data, rather than some subset of a packet. (Cox Rep. at 45.) Even if Dr. Cox's opinion is accurate, however, the terms "normal mode" and "fallback mode" are only found in the description of one preferred embodiment. As Broadcom readily admitted at the *Markman* hearing, this invention is not limited to the preferred embodiment. (R. at 116 (May 7, 2004).) Accordingly, the Court will not limit the claim term on this basis. *See Teleflex,* 299 F.3d at 1328 ("To the extent that the district court construed the term 'clip' to be limited to the embodiment described in the specification, rather

than relying on the language of the claims, we conclude that the district court construed the claim term . . . too narrowly.").

In conclusion, as the claim language describes the transmission of symbols, not packets, ('786, col. 1, ll. 62-63, col. 4, ll. 54-55, col. 5, ll. 21-23 (describing devices operating in one of a "plurality of signaling modes in each of which the duration of each information-carrying *symbol* is KT where K is a positive integer" (emphasis added)), and as Broadcom has not provided a persuasive reason to limit the claim term, the Court finds no basis to accept the limitation Broadcom proposes. Although Agere's proposed construction does not contribute greatly to an understanding of the term, it is an accurate reflection of the claim text, and therefore is adopted: "One of a plurality of OFDM transmission modes."

3. "Prefix and window circuit" (Claim 11) and "Windowing function" (Claim 25)

Broadcom argues that the claim language is limited such that the "window circuit" and "windowing function" employ a gradual roll-off pattern, which is one particular mathematical pattern of windowing. In contrast, Agere suggests that no construction is necessary because the claim language is broad and can refer to any applicable pattern of windowing. The parties agree that the plain and ordinary meaning of the general terms "window circuit" and "windowing function" can refer to numerous mathematical patterns, including, inter alia, rectangular, gradual roll-off, and triangular shapes. (R. at 131 (May 7, 2004); Goodman Supplemental Rep. ¶ 5 (stating that windowing function "can have various shapes as long as it has finite duration").) Accordingly, neither party suggests that these terms have a customary meaning in the relevant art limited to a specific pattern. Therefore, in order to determine whether Broadcom's proposed limitation is

warranted, the Court begins by looking to the intrinsic record to discern whether the presumption of plain and ordinary meaning is rebutted.

The relevant claim language, located in claims 11 and 25,[15] sets up a three-step process whereby: (1) a data stream is partitioned into groups of bits; (2) the bits pass through an inverse Fourier transform circuit ("IFFT"); and (3) the bits pass through a "prefix and window circuit," in the case of claim 11, or are subjected to a "windowing function," in the case of claim 25. ('786 patent, col. 5, ll. 51-67, col. 6, ll. 42-56.) On the basis of these claims, Broadcom presents two arguments in favor of its proposed limitation. First, Broadcom argues that the fact that the windowing occurs after the bits pass through the IFFT compels its construction.[16] According to Broadcom, the symbol is already in a rectangular shape when it leaves the IFFT block. (Cox Supplemental Rep. at 2.) Therefore, Dr. Cox suggests, "no specific windowing circuit would be necessary if the symbol was to remain rectangularly windowed." (*Id.*) Even if Dr. Cox's statement is accurate, however, it does not compel the conclusion that a "gradual roll-off" pattern must be

[15] These claims are interpreted together because they both describe the part of the invention that performs windowing. Claim 11 is an apparatus claim wherein the "prefix and window circuit" performs windowing, while claim 25 is a method claim wherein the "windowing function" itself is described.

[16] In arguing that the terms at issue are not limited to the gradual roll-off pattern, Agere relies on the expert report of Dr. Goodman, in which he states that "rectangular or other types of functions could be used in the invention to accomplish windowing." (Goodman Supplemental Rep. ¶ 8.) The analysis in Dr. Goodman's expert report, however, is based on his misunderstanding that the windowing function in this invention takes place *before* the IFFT. (*See id.* ¶ 4 ("[W]indowing [is] the process of selecting an individual symbol for Fourier analysis.").) Dr. Goodman's belief is plainly contradicted by the claim language, which, as cited above, states that the windowing occurs after the IFFT. At the *Markman* hearing, Dr. Goodman admitted that, according to the claim language, the windowing functions occur after the IFFT. (R. at 16-17 (May 7, 2004); *see also* Cox Supplemental Rep. at 1 (explaining that windowing takes place after IFFT).) Nonetheless, Agere's expert's misunderstanding of the claim language is not, in itself, a basis for this Court to accept Broadcom's contrary construction.

utilized, as opposed to any other non-rectangular function, and Broadcom provides no support for such a conclusion.

Second, Broadcom claims that the patentee explicitly defined the term "windowing" in the specifications as employing a gradual roll-off pattern:

> To reduce spectral sidelobes, the cyclic prefixing and windowing block . . . performs windowing on the OFDM symbol by applying a gradual roll-off pattern to the amplitude of the OFDM symbol.

('786 patent, col. 3, ll. 58-61.) Contrary to Broadcom's assertions, this quoted language does not constitute a clear definition, but rather a description of one particular embodiment. (*Id.*, col. 3, ll. 32-33.) Therefore, it would be inappropriate to import this limitation from the specifications into the broader claim language. *Brookhill-Wilk 1*, 334 F.3d at 1301 ("Absent a clear disclaimer of particular subject matter, the fact that the inventor anticipated that the invention would be used in a particular manner does not limit the scope to that narrow context.").

In conclusion, Broadcom has not provided convincing support to limit the plain and ordinary meaning of the broad claim language. *Telegenix*, 308 F.3d at 1202 ("[U]nless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art."). Nonetheless, the Court finds that some construction is necessary to assist the eventual trier-of-fact. Accordingly, the Court adopts a modified version of Broadcom's proposed constructions.[17] "Windowing function" is construed as "applying a pattern to the amplitude of the OFDM symbol at the beginning and the end of the symbol." "Prefix and window circuit" is construed as "a circuit that copies the last part of the OFDM symbol and augments the OFDM

[17] At the *Markman* hearing, Agere agreed to these modified constructions. (R. at 122, 125 (May 7, 2004); *see also* Agere Reply at 25 n.9.)

symbol by prefixing it with the copied portion of the OFDM symbol, and which also applies a pattern to the amplitude of the OFDM symbol at the beginning and end of the symbol."

D. '705: MODULAR PORTABLE DATA PROCESSING TERMINAL HAVING A HIGHER LAYER AND LOWER LAYER PARTITIONED COMMUNICATION PROTOCOL STACK FOR USE IN A RADIO FREQUENCY COMMUNICATIONS NETWORK

The '705 patent teaches a "portable terminal" consisting of a "base module" and a "selected one of a plurality of communication modules," with each communication module comprising a "module processor," "module memory," and at least one of a plurality of wireless "transceivers." The "selected" communication module is "received" by the base module to enable the base module to communicate with networks that use different communication protocols. The "portable terminal" utilizes a "communication protocol stack having higher and lower layers" that are "specified by industry standards."

1. "Portable terminal" (Claims 1, 2, 10, 11, 12)

The key issue is whether this term is unambiguous and needs no construction, as Broadcom contends, or whether it should be construed to require that the terminal is "designed to be carried by or on a person," as Agere proposes. The limitation that Agere propounds is derived from Webster's II New College Dictionary and certain embodiments in the specification. The Webster's definition cited by Agere, however, does not include any reference to how or by whom the terminal should be carried. WEBSTER'S II NEW COLLEGE DICTIONARY 860 (1999) (defining "portable" as "easily carried or moved"). Furthermore, Agere's own expert, Dr. Goodman, does not support its proposed limitation, testifying in his report that one of ordinary skill in the art would understand the term "portable terminal" to mean "a terminal that is easily carried or moved." (Goodman Rep. ¶ 65.) In

addition, although the specifications describe "hand-held" devices ('705 patent, col. 2, ll. 22-26, col. 7, ll. 31-36, Fig. 25), Agere's proposed limitation would violate the canon of claim construction that claim language is not limited to the embodiments described in the specification. *See Teleflex,* 299 F.3d at 1328; *Comark Communications, Inc. v. Harris Corp.,* 156 F.3d 1182, 1186 (Fed. Cir. 1998) (cautioning against limitation of claimed invention to preferred or specific embodiments or examples). The Court agrees with Broadcom's expert, Dr. Acampora, who testified that the term does not have a technical definition but does have a plain and ordinary meaning that is obvious to both persons skilled in the art and laypersons alike. (Acampora Rep. at 39.) As the Court finds no basis to limit this term's obvious, plain, and ordinary meaning, the Court holds that the term "portable terminal" does not require construction.[18]

2. "Communication module" (Claims 1, 2, 10, 11, 12)

The debate over this claim term concerns Agere's proposed construction of a "module" as "as self-contained" unit. This language is found in the definition of "module" in Webster's II New College Dictionary, and Broadcom does not object to it per se.[19] Broadcom asserts, however, that if the modifier "self-contained" connotes the ability to function independently, then it is inaccurate and in conflict with the claim language.

As the claim language makes clear, this patent describes removable, interchangeable modules

[18] For discussion regarding the definition of "portable" in a similar context, *see infra* Part II.E.5.

[19] Webster's II New College Dictionary defines "module" as "a self-contained assembly of electronic components and circuitry, as a stage in a computer." WEBSTER'S II NEW COLLEGE DICTIONARY 705 (1999). The IEEE dictionary definition omits the modifier "self-contained." (*See* Goodman Rep. at 25 (citing IEEE at 817 ("any assembly of interconnected components which constitutes an identifiable device, instrument, or piece of equipment.")).)

that can function only when assembled into the base module. (*See* '705 patent, col. 38, ll. 26-27 ("[T]he base module receiving the selected one of the plurality of communication modules in an assembled position.").) The "communication module," as this term is used in the '705 patent, is not an independently-functioning entity but rather a component that, once inserted into the base module, enables communication between the base processor and a wireless transceiver. (*Id.*, col. 38, ll. 30-36.) Furthermore, the specification describes instances in which the communication module may access and utilize external components in the receiving device in order to function. (*See, e.g.*, *id.* col. 4, ll. 8-12 (teaching that communication module, after having been inserted into receiving device, may connect to external antenna located within the receiving device), col. 32, ll. 21-33 (describing embodiment wherein radio card accesses antenna in receiving device).) Finally, Agere's expert, Dr. Goodman, confirmed at the *Markman* hearing that his inclusion of the term "self-contained" in the construction was not meant to imply that the module was able to function independently, but rather that "it's all within one packaging of some sort." (R. at 269 (May 6, 2004).) Therefore, the claim language, specifications, and expert testimony demonstrate that the claimed "communication modules" do not function independently. Thus, the Court will adopt the following construction for communication module: "A self-contained assembly of electronic components and circuitry used for the transmission or reception of information. A communication module cannot function independently."[20]

3. "Module processor" and "Module memory" (Claims 1, 10, 11, 12)

As the parties' arguments regarding these two claim terms are related, the Court addresses

[20] Agere proposed this construction in its post-*Markman* brief. The Court finds that it is both accurate and responsive to Broadcom's concerns. (R. at 297 (May 6, 2004); *see also* Agere's Post-*Markman* Br. at 9.)

them in tandem. Agere proposes that these terms should be construed as requiring physical attachment to the communication module, while Broadcom suggests that they do not need construction at all. Looking to the claim language for primary support, Agere asserts that "as a matter of simple grammar, the modifier 'module' signifies that the processor belongs to the 'communication module.'" (Agere's Resp. at 12; Goodman Rep. ¶ 78 ("Because the word 'module' is used to modify the word 'processor' in the claims, the 'processor' is clearly contained within the 'communication module.'").) The claim language itself and its grammatical construction, however, do not require that the module processor and module memory be physically attached to the communication module. The claim language only requires that the communication module be "compris[ed]" of, inter alia, a module processor and a module memory. ('705 patent, col. 38, ll. 14-15 ("each communication module comprising a module processor [and] a module memory"), col. 39, ll. 8-9 (same).) A person of skill in the art would understand that this relationship could be accomplished either by physical attachment, or, alternatively, by an electrical association. (Acampora Rep. at 35, 37 (testifying that person of ordinary skill would understand from claim language that module processor and module memory are "associated" with communication module, not necessarily physically attached).) Accordingly, the Court finds that the claim language itself does not support Agere's proposed limitation.

Similarly, the patent specifications do not require that the "module memory" and "module processor" be physically attached to the "communication module." While Figures 1A and 2 in the '705 patent suggest that, in various embodiments, the "module memory" and "module processor" *may* be physically attached to the "communication module," these figures are explicitly referred to as "a schematic diagram of *functional* blocks" ('705 patent, col. 5, l. 21 (emphasis added)), and "a

schematic diagram of *functional* interfaces" (*id.*, col. 5, l. 28 (emphasis added)), respectively. Accordingly, a skilled artisan would understand that these representations describe *functional* rather than physical relationships. (Acampora Rep. at 35.) Furthermore, even if these figures were to demonstrate a physical connection, they would only represent particular embodiments of the invention and could not be used to limit the broader claim language. *Electro Med. Sys., S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994) ("[P]articular embodiments appearing in a specification will not be read into the claims when the claim language is broader than such embodiments."). In conclusion, the claim language and specification do not support the limitation Agere proposes. Accordingly, the Court agrees with Dr. Acampora and finds that these terms need no construction. (Acampora Rep. at 35 ("[T]he plain meaning of the phrase is understood by a skilled artisan."), 37 (same).)

4. "Transceiver" (Claims 1, 10)

The dispute regarding this term involves competing dictionary definitions. Broadcom cites the Oxford English Dictionary and Newton's Telecom Dictionary for the proposition that a transceiver is "a combined transmitter and receiver." (Broadcom Opening at 45.) Agere cites the IEEE Dictionary for the more specific definition of a transceiver as "transmitting and receiving equipment in a common housing, usually for portable or mobile use, and employing common circuit components for both transmitting and receiving." (Agere Resp. at 16.)

Seeking support for its broader definition, Broadcom relies heavily on the Federal Circuit's statement that "[i]f more than one dictionary definition is consistent with the use of the words in the intrinsic record, the claim terms may be construed to encompass all such consistent meanings." *Texas Digital*, 308 F.3d at 1203 (*citing Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1343 (Fed.

Cir. 2001)); *see also Inverness Med. Switzerland GmbH v. Warner Lambert Co.*, 309 F.3d 1373, 1379 (Fed. Cir. 2002) (same). The *Texas Digital* court noted, however, that "the intrinsic record may show that the specification uses the words in a manner clearly inconsistent with the ordinary meaning reflected . . . in a dictionary definition. In such a case, the inconsistent dictionary definition must be rejected." *Texas Digital*, 308 F.3d at 1206. Indeed, as the Federal Circuit stated in *Toro Co. v. White Consolidated Industries, Inc.*, when each side propounds its own dictionary-supported construction, "[t]his question cannot be decided by a dictionary. . . . [D]ictionaries provide general definitions, rarely in sufficient detail to resolve close questions in particular contexts." 199 F.3d 1295, 1300 (Fed. Cir. 1999); *see also Inverness*, 309 F.3d at 1379 (noting that, in determining which dictionary definition to use, court "must determine whether the specification or prosecution history clearly demonstrates that only one of the multiple meanings was intended").[21] Thus, the instant term cannot properly be construed without analyzing the intrinsic record.

The claim text teaches a communication module "comprising . . . at least one of a plurality of wireless transceivers." ('705 patent, col. 38, ll. 14-16, col. 39, ll. 8-10.) In light of the parties' competing dictionary definitions, the Court must look to the specifications in order to determine whether the context of the claims supports either of the proposed constructions. Agere has provided convincing textual support for its limitation that the transmitter and receiver must be "equipment within common housing . . . employing common circuit[ry]." The written description in the

[21] The Court notes that Federal Circuit law regarding conflicting dictionary definitions appears to be in flux, provoking three dissenting opinions within the last three months alone. *See Nystrom v. TREX Co., Inc.*, --- F.3d ---, 2004 WL 1432247, at *13-16, 2004 U.S. App. LEXIS 13407, at *37-47 (Fed. Cir. June 28, 2004) (Gajarsa, J., dissenting in part); *Housey Pharmaceuticals, Inc. v. Astrazeneca UK Ltd.*, 366 F.3d 1348, 1358 (Fed. Cir. 2004) (Newman, J., dissenting); *Novartis Pharmaceuticals Corp. v. Eon Labs Mfg., Inc.*, 363 F.3d 1306, 1315 (Fed. Cir. 2004) (Clevenger, J., dissenting).

specification refers to a "modular transceiver" (*id*., col. 3, ll. 33-34), and teaches that multiple transceivers can be contained on one single radio card (*id.*, col. 4, ll. 3-4 ("[T]he radio card may contain more than one type of radio transceiver.")). Furthermore, the embodiments in the specifications also describe "transceiver modules" (*id*., col. 15, ll. 33-34) and transceivers that are contained within a communication module (*id*., col. 37, ll. 47-49 ("[T]he communication module . . . contains multiple transceivers.")). As discussed previously, a "module" is a self-contained assembly of electronic components and circuitry. *See supra* Part.II.D.2. Thus, the Court finds that the written description's reference to a "modular transceiver" and "transceiver modules," clearly suggests that the transmitting and receiving components reside in common housing and employ common circuitry. Accordingly, the Court adopts Agere's proposed construction.

5. "Selected" (Claims 1, 10, 11)

The term "selected" has a plain and ordinary meaning that is obvious to both skilled artisans and laypersons alike. (Broadcom Reply at 46 (citing Webster's definition of "chosen"); Acampora Rep. at 40.) A claim term assumes its ordinary and customary meaning "unless the patentee . . . redefin[es] the term or . . . characteriz[es] the invention in the intrinsic record using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Teleflex*, 299 F.3d at 1327. Agere proposes that the Court adopt the construction that "selected" means "inserted" because, according to Agere, the patentee explicitly redefined the term as such. *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (noting that patentee's explicit definition of term controls).

A review of the claim language reveals no basis for the Court to deviate from the plain and ordinary meaning of this term. Agere derives its limiting construction from the final preferred

embodiment described in the specification in which the patentee writes: "In addition, the base module may interrogate the selected ('inserted') communication module(s) to determine which antennas to interconnect." ('705 patent, col. 37, ll. 58-60.) This parenthetical does not indicate a clear intention on the part of the patentee to redefine the term "selected" within the context of this patent. The Court concurs with Broadcom's expert, who testified that a skilled artisan would interpret this parenthetical not as a redefinition of the term "selected," but rather as an acknowledgment that the base module cannot "interrogate" the chosen communication module until it has been inserted into the base module. (Acampora Rep. at 41.) This conclusion is consistent with the claim language, which suggests a two-step process comprised of "selecting" a communication module and "inserting" the module into the base module. ('705 patent, col. 38, ll. 26-27 ("[T]he base module *receiving* the *selected one* of the plurality of communication modules in an assembled position") (emphasis added).)

For the foregoing reasons, the Court cannot conclude that one parenthetical, located in one preferred embodiment, exhibits the patentee's "clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Brookhill-Wilk 1*, 334 F.3d at 1299. Thus, the Court finds that the term "selected" is used in accordance with its plain and ordinary meaning and requires no construction.

6. "Lower layers" (Claim 1)

The portable terminal described in Claim 1 of the '705 patent utilizes a "communication protocol stack having higher and lower layers specified by industry standards." ('705 patent, col. 38, ll. 6-8.) As background, a "protocol stack" is an abstract method of dividing the various communications functions of a data network into hierarchical layers. (Acampora Rep. at 42.) Both

parties agree that, at the time of this patent's invention, there were multiple industry-standard protocol stacks in existence, any of which could have been utilized by the portable terminal described in the '705 patent. (R. at 270 (May 6, 2004).)

The dispute over this claim term concerns the content of the "lower layers" of the protocol stack in the '705 patent. According to Agere's proposed construction, the term "lower layers" is specifically limited to the two bottom-most layers in the seven-layer "OSI model,"[22] namely, the "data link layer" and the "physical layer." In contrast, Broadcom's proposal describes the term "lower layers" more broadly as "the layers below a dividing line in a layered protocol model."

The Court's analysis of this term begins with the claim language. The term "lower layers" is clearly a relative concept that must derive its content in relation to "higher layers" in the protocol stack. (R. at 271 (May 6, 2004) ("[O]bviously, lower is a relative term. I don't know about a dividing line, but they're lower than something.") (Goodman).) The language of claim 1 itself does not provide much further content or limitation to this term, except that the lower and higher layers of the protocol stack are "specified by industry standards." ('705 patent, col. 38, ll. 7-8.) As there were multiple industry standards in existence at the time of this invention, a person of skill in the art would not understand the claim language to be limited to the two bottom-most layers of the OSI-model. (Acampora Rep. at 43.) Accordingly, the claim language supports Broadcom's construction.

A review of additional evidence in the intrinsic record similarly provides no basis to limit the broad claim text. The patent specifications teach that the dividing line between lower and higher layers of the protocol stack may vary. (R. at 277 (May 6, 2004); '705 patent, col. 10, ll. 39-40

[22] The OSI model is one generally-recognized protocol stack consisting of seven layers. (Acampora Rep. at 42.) Although the parties dispute whether the OSI model constitutes an "industry standard," the resolution of this dispute is not necessary at this time.

("Alternatively, the dividing line might also be drawn at a higher level, for example, at the network layer . . . or at somewhere in between.").) In addition, dependant claim 9 and Figure 1C each demonstrate that the "lower layers" are not limited to the data link and physical layers, but can also include portions of the network layer. ('705 patent, col. 38, ll. 63-65 ("The portable terminal of claim 1 wherein the lower layers of the communication protocol stack includes at least a portion of a network layer"); *see also* R. at 277 (May 6, 2004) (acknowledging that Figure 1C depicts lower layer as including portion of network layer).) In fact, Agere's expert, Dr. Goodman, conceded this point at the *Markman* hearing, admitting that the term "lower layers" may include layers beyond the physical and data link layer. (R. at 273 (May 6, 2004) ("[T]he module memory can store lower layers of the communication protocol stack by storing the data link layer and the physical layer *and other layers*." (emphasis added)).)

Despite Dr. Goodman's concessions at the *Markman* hearing, Agere nonetheless makes the additional argument that its construction is dictated by an explicit definition of the term "lower layers" in the specification. *Renishaw*, 158 F.3d at 1249 (noting that, when patent applicant acts as own lexicographer, the provided definition controls). In one portion of the specification, the patentee describes the embodiment illustrated by Figure 1B and states: "the functionality of the lower layers (i.e. data link layer and physical layer[)] is performed by the microprocessor of the data and communication module." ('705 patent, col. 10, ll. 1-4.) Agere argues that this constitutes an explicit definition of the term "lower layers" that limits the term's meaning in the remainder of the patent. Agere's argument is unsuccessful, however, as this specification clearly does not define the term "lower layers" generally, but rather describes which layers are "lower" for the purposes of this one particular embodiment. (*Id.*, col. 9, l. 60); *Electro Med.*, 34 F.3d at 1054. In conclusion, as Agere

has not provided any basis upon which to limit the broad claim language, the Court adopts the plain and ordinary meaning of this claim term, which is: "The layers below a dividing line in a layered protocol model."

7. "Lowest layer" (Claim 10)

Agere proposes that the term "lowest layer" should be construed as "the physical layer," while Broadcom suggests that the term should be construed as "the bottom-most layer in a layered protocol model." As the *Markman* hearing revealed, the parties' core dispute concerns whether Agere's use of the word "physical" is merely descriptive or a specific reference to the lowest layer of the protocol stack in the OSI model. As discussed above, the meaning of this term is determined with reference to "industry standards," of which there are many, each with different names for the lowest layer. ('705 patent, col. 38, ll. 66-col. 39, l. 1 ("A portable terminal utilizing a communication protocol stack having a highest layer, at least one middle layer and a lowest layer *specified by industry standards*.") (emphasis added).) For instance, the lowest layer of the SS7 protocol stack is called the MTP 1 layer. (Broadcom Reply at 53.) Thus, for the same reasons as set forth regarding the previous term, it would be inappropriate and in conflict with the broad claim language to limit this term to the name of the lowest layer in one particular protocol stack. Therefore, the Court accords this term its plain and ordinary meaning: "The bottom-most layer in a layered protocol model."[23]

[23] While the Court finds that this claim term is not confined to the lowest layer of the OSI model, the parties agree that the lowest layer of all extant layered protocol stacks includes some physical component. (R. at 319-20 (May 6, 2004); Goodman Rep. ¶ 94 ("As far as I am aware, in every layered protocol model (be it a standard, public or private protocol), the bottom-most layer is the physical layer.").)

8. "Instructions" (Claim 10)

Despite Broadcom's assertion that no construction is necessary, the Court finds that the technical meaning of this term in the context of the '705 patent requires some clarification for the trier-of-fact. At the *Markman* hearing, both parties agreed that the IEEE definition of "any executable statement in a computer program" is an accurate construction of the claim term. IEEE STANDARD DICTIONARY OF ELECTRICAL AND ELECTRONICS TERMS 232 (5th ed. 1996); (*see* R. at 331, 335 (May 6, 2004).) Accordingly, the Court adopts this definition as the construction of the term "instructions."

E. '311, '366, AND '771: "SLEEP MODE" PATENTS[24]

Together, these three patents describe a network in which wireless devices reduce their power consumption by "selectively deactivating" themselves, or going into sleep mode, when not receiving messages. This network is comprised, in relevant part, of: (a) "roaming terminals," which are the wireless devices in question and which comprise "data collection systems" with "transceivers"; (b) "base stations," which deliver messages from the wired network to the roaming terminals and also have transceivers; (c) "bridging nodes," which are intermediate nodes in the network; and (d) "access points," the function of which is in dispute.

According to the patents, when a base station has a message to deliver to a roaming terminal, the base station first determines whether that terminal is in sleep mode. If the terminal is awake, the base station attempts to "immediately" deliver the message. If the terminal is in sleep mode, the base

[24] '311: Communication Network Having a Plurality of Bridging Nodes Which Transmit a Beacon to Terminal Nodes in Power Saving State That It Has Messages Awaiting Delivery; '366: Communication Network Having a Plurality of Bridging Nodes Which Transmit a Beacon to Terminal Nodes in Power Saving State That It Has Messages Awaiting Delivery; '771: Network Supporting Roaming, Sleeping Terminals.

station instead transmits at "predetermined intervals" a "beacon" that contains a "pending message list." The roaming terminal awakens at predetermined intervals to listen for this beacon and receive any pending message lists. If no such list is transmitted, the terminal goes back into sleep mode, but if the terminal receives a pending message list, it knows there is a message awaiting transmission.

1. "Bridging node" ('366, Claims 5, 19, 21; '311, Claim 16)[25]

The parties agree that a bridging node is a non-terminal or intermediate node in a network but disagree as to whether the term also serves a customary function within the network that should be included in its construction. Broadcom argues that bridging nodes had a customary meaning at the time of patenting and offers as support a "word search conducted on the USPTO website," which discloses twenty-two patents using that term. (Acampora Rep. at 5-6.) This evidence, however, provides little support to Broadcom, as it indicates nothing about how these patents define the term at issue, much less whether they each use it in the manner that Broadcom proposes.[26] In contrast, Agere notes that no dictionary or treatise extant at the time of patenting contained a definition of "bridging node" and that a Special Master in a prior federal lawsuit has found, through exhaustive analysis, that the term at issue had no customary meaning. (Goodman Rep. ¶¶ 119-20; Agere Resp. Ex. 18 at 44 (*ST Microelectronics, Inc. v. Broadcom Corp.*, Civ. No. 02-362, Special Master's Report and Recommendation on Claim Construction (E.D. Tex. Dec. 31, 2003)).) This Court finds the Special Master's reasoning, in combination with the lack of meaningful evidence supporting

[25] It is undisputed that the '366 and '311 patents should be construed together because they are, for all relevant purposes, identical. (R. at 40 (May 6, 2004).)

[26] Broadcom cites language from four of these patents that allegedly supports its definition, but such support is tenuous at best. For example, patent 4,644,468 uses bridging nodes to, inter alia, "reformat" data. *See* U.S. Patent No. 4,644,468, col. 3, l. 66-col. 4, l. 3. This is substantially different from the mere "repeating" function that Broadcom proposes.

Broadcom's argument, persuasive and holds that "bridging node" did not have a customary meaning to persons of skill in the art at the time the patents were issued.

In the absence of a customary meaning, Agere urges the Court to adopt in full the construction given by the Special Master in the Texas litigation.[27] There are three aspects, however, in which this definition appears deficient. First, the Special Master defined "bridging node" as a node "that is used to bridge." This is, of course, circular. Instead, the Court finds that "bridging" means to relay messages, a definition that, although Agere contends it is incomplete, neither party claims is incorrect. (*Cf.* Goodman Rep. ¶ 133 (arguing that bridging node is not limited to relaying function; *see also infra* note 29).) Second, the Special Master found that a bridging node is a node "in a tree." As Broadcom notes, this appears to refer to an embodiment of the invention that uses the spanning tree topology.[28] This embodiment is set out in dependent claim 8, which describes the "bridging devices" of the "communication network" of claims 7 and 5 (wherein the bridging nodes are claimed) as "participat[ing] in spanning tree routing." Therefore, if the bridging nodes of claim 5 were limited to spanning tree embodiments, claim 8 would be rendered superfluous. Such a construction would violate the doctrine of claim differentiation, which generally requires courts to avoid construing a claim in a manner that would render another claim superfluous. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) ("[W]here the limitation

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[27] Agere also raises a collateral estoppel argument. This argument fails because, inter alia, the parties to the first suit apparently settled their claims before the district court could approve the Special Master's report. (Agere Supplemental Br. at 5.)

[28] Agere argues that its construction refers only to a "tree," while the preferred embodiment discusses a "spanning tree." This argument, however, is belied by the fact that the second sentence of Agere's construction is taken verbatim from the "spanning tree" preferred embodiment, as discussed below.

that is sought to be 'read into' an independent claim already appears in a dependent claim, the doctrine of claim differentiation is at its strongest."). Thus, the Court rejects the "tree" requirement in Agere's proposed construction. Finally, the Special Master's definition contains a second and distinct sentence that sets out two additional functions of the bridging node: "a network interface function" and "a routing function." These functions are mentioned solely in the "spanning tree" embodiment discussed above ('366 patent, col. 8, l. 54-col. 9, l. 3), and therefore cannot properly be used to limit the broader claim term.

In sum, the Court will modify Agere's proposed construction by striking the references to "tree," "network interface," and "routing," and by replacing "bridg[es]" with "relays." The resulting construction is: "A non-terminal node that relays messages in an interconnected network."[29]

2. "Access point" ('311, Claims 1, 2, 10)

Like the previous term, the construction of this term turns on whether it had a customary meaning at the time of the invention. Broadcom argues that "access point" had a customary meaning as an "element in a network that repeats data messages and provides access to the infrastructure." Agere claims that this meaning arose only after the '311 patent filing, and that the patentee explicitly defined the term "access point" in an appendix to the patent.

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[29] Dr. Goodman opines that this definition is inappropriate because it describes a "repeater," and that the patentee distinguished between repeaters and bridging nodes in the prosecution history. What the prosecution history demonstrates, however, is that the patentee amended his application to replace the term "repeater" with the term "base station," while also adding the "spanning tree" preferred embodiment, including the bridging node language at issue. (*Compare* Agere Resp. Ex. 23 at 18, *with* Agere Resp. Ex. 57 at 17-18.) Not only does this set of amendments fail to imply any particular relationship between "repeater" and "base station"—the latter could have been substituted because it was a synonym or, alternatively, because it had a different and more accurate meaning to the patent than the former—it also fails to support any conclusion regarding the relationship between the deleted "repeater" and the added "bridging node" language.

In support of its contention, Broadcom relies primarily on two sources. First, Broadcom cites the IEEE dictionary from 1996, which defines access point as "[t]he point at which an abstract service is obtained." (Broadcom Opening Ex. I at 6.) Agere argues that this reference is untimely, given that the invention at issue occurred in 1991. The Court agrees. The application that eventually became the '311 patent was filed in November 1991, over four years before the IEEE dictionary was published and almost six years before the 802.11 standard that codified wireless communication protocols was formally adopted. It is undisputed that the understanding of the term "access point," along with other portions of the 802.11 standard, was in flux during the 1990s. *See Applications: Wireless Set*, SMT TRENDS, Jan. 31, 1997 (noting incompleteness of 802.11 standard); Barry Phillips, *Wireless LANs: Not of This World*, OEM MAGAZINE, Feb. 1, 1996 at 78 (noting that 802.11 standard was not yet "fully nail[ed] down"). Therefore, in the absence of evidence establishing that the 1996 IEEE dictionary definition was based upon the customary understanding of access points in 1991, the Court finds that this dictionary does not establish that "access point" had a customary meaning to a person of skill in the art at the relevant time.

Second, Broadcom cites a 1991 paper that defines "access point" consistently with Broadcom's proposed construction. (Broadcom Opening Ex. O at 23, 44 (Ken Biba, *A Hybrid Wireless MAC Protocol Supporting Asynchronous and Synchronous MSDU Delivery Services*, IEEE 802.11 (Sept. 1991)).) It seems, however, that this paper did not set out terms as they were customarily understood at the time, but rather proposed new ideas that were later incorporated into the 802.11 standard. (*See id*. at 1 ("The proposals of this paper should be considered an initial design sketch for the proposed protocol. Much work remains to fully specify and performance model the outlined services.").) Accordingly, the Court finds that the Biba paper fails to establish that the term

"access point" had a customary meaning to a person of skill in the art at the time of the invention. Furthermore, Broadcom having presented no other evidence showing the existence of a customary meaning, the Court holds that this term had no such meaning in 1991.

Having found that there was no customary meaning, the Court looks to the specifications for a proper construction. Agere argues that an appendix to the patent explicitly defines the term "access point." The appendix in question, however, defines the term "terminal access point," and there is no evidence that "terminal access point" and "access point" are synonyms. (Acampora Rep. at 11 (describing differences between "terminal access point" and "access point"); *see also* Goodman Rep. ¶ 163 (applying, without explanation, definition of "terminal access point" to "access point").)[30] In fact, the claim language itself belies any argument that these terms are synonyms, for claim 1 teaches that access points deliver messages to "terminal nodes" ('311 patent, col. 19, ll. 64-67), and terminal nodes contain terminal access points. (*Id.*, App. C, Fig 1.1; R. at 66 (May 6, 2004).) In other words, the claim language itself distinguishes between access points and terminal access points, and therefore it would be inappropriate to construe the former with a definition of the latter.

In sum, the Court rejects both parties' proposed constructions. Because the specifications do not suggest any helpful construction language, the Court will decline to create a construction sua sponte. If necessary, however, the Court will permit the parties to submit supplemental briefs regarding this issue in accordance with the Order following this Memorandum.

3. "Beacon" ('366, Claims 5, 19; '311, Claims 1, 2, 16)

Broadcom proposes to construe "beacon" as "a signal sent at predetermined intervals," which

[30] Similarly, Dr. Goodman supports his construction of "access point" with an IEEE definition of "service access point" but provides no explanation as to whether these terms are synonymous. (Goodman Rep. ¶ 162.)

Broadcom asserts was the customary meaning of the term in 1991. As evidence, Broadcom provides the testimony of Dr. Acampora, who in turn relies on two allegedly contemporaneous patents and the aforementioned Biba paper. As discussed previously, the Biba paper is insufficient to determine the customary meaning of an 802.11-related term because it is unclear to the Court whether the paper's definition of such terms was novel or customary at the time of publication. Regarding the two patents cited by Dr. Acampora, one is untimely, having been filed in September 1994. (*See* U.S. Patent No. 5,606,560.) The other, filed in 1992, states that beacons are transmitted "on a recurring, time-intervaled basis." (U.S. Patent No. 5,548,818, col. 3, ll. 51-52). Although this language supports Broadcom's position, the Court finds it insufficient, even when combined with the limited implications of the Biba paper, to establish that Broadcom's construction was the customary meaning of "beacon" in 1991. Stated differently, a single technical paper of unclear authoritativeness and a single contemporaneous patent, particularly in the absence of a more-broadly applicable reference, such as a dictionary, do not establish to the Court that persons of ordinary skill possessed a common understanding of the claim term.[31] Accordingly, the Court examines the claim context and specifications to determine the appropriate construction.

Agere proposes to construe "beacon" as a "packet containing a seed value." The "seed value" limitation, however, is derived from a single embodiment of the beacon in the specifications. ('366 patent, col. 12, ll. 24-25.) The specifications also disclose embodiments wherein the beacons do not contain seed values. ('311 patent, col. 3, ll. 60-63; *see also* '366 patent, col. 15, ll. 45-47.) Thus,

[31] Agere confusingly argues both that there was no customary meaning and that the inventor of the '366 patent, Dr. Robert Meier, testified to not having used the term in accordance with its customary meaning. The Court considers these arguments irrelevant, however, because they are based upon testimony regarding the term "radio beacon," which is not the term at issue. (Goodman Rep. ¶ 149.)

the Court rejects Agere's construction as an improper narrowing of the claim by use of a preferred embodiment.

By contrast, Broadcom's construction is supported by the claim text, which states that beacons are "transmitted at predetermined intervals." ('311 patent, col. 19, l. 67-col. 20, l. 1; '366 patent, col. 20, l. 53.) Because the term "beacon" does not appear in the specifications, and because the "predetermined interval" limitation is the only modifier uniformly used for this term in the '311 and '366 claims, the Court finds that "beacon" is appropriately construed as a "signal sent at a predetermined interval."

Agere argues that Broadcom's construction is overbroad, in that it effectively reads any limitation out of the term because the "predetermined interval" language is already in the claim text. The basis for this argument is claim 1 of the '311 patent, which states that the access point "transmit[s] at predetermined intervals beacons." Agere claims that to use Broadcom's construction would result in the access point "sending signals at predetermined intervals," which in effect simply substitutes the word "signal" for "beacon." This argument, however, neglects the next clause in the claim, which reads, "[beacons] that identify that a message awaits delivery." In total, therefore, the claim as construed by Broadcom reads, "access points . . . transmitting signals at predetermined intervals that identify that a message awaits delivery." Similarly, claim 5 of the '366 patent, as construed, reads "bridging nodes . . . transmitting signals at predetermined intervals that identify . . . wireless terminal nodes operating in the power saving state that have a message awaiting delivery." Thus, each claim itself places a content requirement on the beacon, rendering Agere's concerns about overbreadth misplaced. Accordingly, the Court adopts Broadcom's proposed

construction.[32]

4. "Predetermined" ('366, Claim 5, 19; '311, Claims 1, 16)

Broadcom argues that no construction is necessary for this term, while Agere seeks to construe it as "calculated before a bridging node transmits each succeeding beacon." Agere's only support for its assertion that the timing of each beacon must be calculated independently is found in the embodiments of the '366 patent. (*See, e.g.*, '366 patent, col. 15, ll. 29-31, col. 19, ll. 18-31.) Although Agere appears to be correct in arguing that there are no embodiments that contradict its construction, there is also no language in the specifications indicating that such a construction is required. In other words, the claim term is broader than its preferred embodiments, and therefore the Court rejects Agere's proposed construction as an attempt to improperly limit the term to its specifications. In addition, Agere's argument that "predetermined" necessarily implies "calculated" is based on a tortured reading of Webster's Dictionary, which even Agere's expert admits does *not* define "predetermined" to mean "calculated." (*See* Goodman Rep. ¶ 136 (citing Webster's dictionary definition of predetermine as "determine, decide, or establish ahead of time").) Thus, the Court finds that there is no factual support for Agere's proposed construction. Accordingly, in the absence of persuasive evidence indicating the need for a specific construction, the Court credits Dr. Acampora's testimony that both a person of skill in the art and a layperson would understand this

[32] Agere argues, for this term as well as others, that Broadcom's current position is different from that taken in other litigation. The Court finds these arguments irrelevant for two reasons. First, the Federal Rules of Civil Procedure do not prohibit the assertion of contradictory positions in the same lawsuit, much less in different suits. *See* FED. R. CIV. PROC. 8(a). Second, both parties, within the context of this case alone, assert a multitude of self-contradictory positions (including this one), each time tailoring their arguments to the term at hand. The Court finds nothing problematic in the tailoring of arguments to differing cases and factual scenarios, for this is, of course, a hallmark of effective advocacy.

term to have its customary meaning. (Acampora Rep. at 20.) Therefore, no construction is necessary. *See W.E. Hall*, 370 F.3d at 1350 (affirming district court determination that term "single piece" was "sufficiently clear to make even resort to the dictionary unnecessary").

5. "Roaming terminal/device" ('311, Claim 14; '366, Claims 7, 24; '771, Claims 1, 2, 3)

At oral argument, Broadcom proposed the compromise construction of "roaming" as "designed to be able to be moved" (R. at 169 (May 6, 2004)), while Agere proposed "designed to move" (*id*. at 174).[33] Regarding Broadcom's construction, the Court agrees with Agere that there is some ambiguity in the phrase "able to be moved," which could theoretically refer to anything not carved in bedrock. The Court, however, does not find Agere's construction to be a viable alternative. Agere supports its position with the testimony of Dr. Goodman, who cites a portion of the specifications referring to "mobile portable transceiver units *being moved* about a warehouse." ('771 patent, col. 3, ll. 41-43 (emphasis added).)[34] The Court agrees that this phrase is instructive,

[33] To the extent that Agere has not abandoned its original construction of "roaming" as "moving" (R. at 165 (May 6, 2004)), the Court finds that this construction is unsupported by the claim language. The '771 patent teaches "roaming terminals" that receive transmissions from base stations. There is no doubt that these transmissions can occur even if the "roaming terminal" happens to be stationary at the time of transmission, as is often the case with, for example, laptop computers. Agere's construction, however, would require the opposite—the transmissions could occur only when the terminals were moving, for otherwise the terminals would not be "roaming" at that time. This construction is therefore contrary to the functioning of the patent as a whole. The only extrinsic support Agere provides for its argument is a Webster's Dictionary definition of "to roam" as "to move." As discussed below, however, this definition supports construing the term to specify that transmissions may be received while the terminal is in motion, rather than that the terminal itself must be in motion while receiving transmissions. Agere's original proposed construction is therefore without evidentiary support and is accordingly rejected.

[34] Although Agere disputes Broadcom's use of the '771 patent specifications to interpret the '311 and '366 patents in other contexts, the parties seem to agree that the customary meaning of the instant term is consistent throughout these patents. To the extent that Agere maintains its objection, the Court notes that its analysis of the "roaming" term is primarily dictionary-based and equally

although not in the manner Agere suggests. The two adjectives "mobile" and "portable" are both defined by Webster's dictionary as "capable of being moved." *See* WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1450, 1768 (1993) (defining mobile as "capable of moving or being moved" and portable as "capable of being carried[;] easily or conveniently transported"). The "being moved" language in the specification is not to the contrary, for when placed in context it refers to the fact that the "mobile portable transceiver units" "may be communicative with" their base stations while the former are "being moved." ('771 patent, col. 3, ll. 41-43.) In other words, the specifications describe devices that are capable of being moved while still remaining in contact with the network. Thus, the Court finds that the most appropriate construction of "roaming terminal/device" is "a terminal/device that is free from cable connections and designed to be able to be moved while receiving or transmitting signals."

6. "Immediately" ('366, Claim 5; '311 Claim 1)

Agere argues that "immediately" means "without delay," while Broadcom proposes a construction of "at the next opportunity." Broadcom admits that its construction is not supported by the ordinary, nontechnical dictionary definition of "immediately" but argues that persons of skill in the art would understand the term to take into account various delays inherent in wireless communication. (Acampora Rep. at 26.) Agere's expert, Dr. Goodman, agrees that a skilled artisan would factor inherent delays into his or her definition of "immediately." (R. at 87 (May 6, 2004).) Thus, it is undisputed that a person of skill in the art would understand both that "immediately" is

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applicable to all three patents.

not "instantaneously" and that it encompasses inherent delays.[35] Accordingly, the Court finds that "immediately" means "with no delays except for those delays inherent in wireless communication."

7. "Transceiver" ('366, Claims 5, 19; '311, Claim 16; '771, Claim 1)

As discussed previously, *see supra* Part II.D.4, the Court looks to the specifications to determine which dictionary definition of this term is most appropriate for each patent: Broadcom's proposal of "a combined transmitter and receiver" or Agere's proposal of "transmitting and receiving equipment in a common housing . . ., employing common circuit components for both transmitting and receiving."

a. '771 Patent

The claim text teaches a base station "having" a transceiver ('771 patent, col 54, ll. 14-15) and a roaming terminal "comprising" a data collection system "having" a transceiver (*id.*, col. 54, ll. 18-20). It is undisputed that both base stations and roaming terminals are "combined transmitters and receivers" (*see* Goodman Rep. ¶ 159); the relevant question, therefore, is whether base stations and roaming terminals also have "transmitting and receiving equipment in a common housing . . ., employing common circuit components for both transmitting and receiving."

Although it is a close case, the Court finds insufficient support in the specifications for Agere's proposed construction. In arguing that the specifications support its definition, Agere cites language referring to "transceiver units" ('771 patent, col. 7, ll. 29-32), "transceiver circuitry" (*id.*, col. 52, ll. 52-54), and the "terminal radio" (*id.*, col. 53, ll. 54-62). These specifications, however,

[35] The parties' disagreement concerning which delays are inherent and which merely arise from specific embodiments need not be resolved at this time because neither party has asked the Court to include any particular delay in its construction. Similarly, because even Agere's expert concedes that some delays are inherent, the Court need not determine the appropriateness of Broadcom's attempt to demonstrate the existence of inherent delays by reference to the '771 patent.

do not indicate any necessary limitation of the invention to commonly-housed or commonly-circuited transceivers. First, all three of these citations refer to specific embodiments of the device, and as such do not provide a basis for limiting the broader claim text. Second, contrary to Agere's argument: (a) "transceiver unit" could refer to a linked, but separately-housed, transmitter and receiver;[36] (b) "transceiver circuitry" could refer to the aggregate circuitry of the transmitter and receiver without requiring that this circuitry be shared; and (c) "terminal radio" suffers both of these ambiguities. Thus, in the absence of stronger textual indications that the term should be limited, the Court finds that the term at issue should be construed using the broader dictionary definition.

The Court agrees with Agere, however, that Broadcom's proposed construction is even broader than the OED and Newton's definitions on which it relies. Unlike Broadcom's construction, which refers merely to "a combined transmitter and receiver," both dictionaries, like the IEEE, specifically refer to physical devices. (Broadcom Opening at 45 (citing OED definition, "instrument," and Newton's Telecom Dictionary definition, "device").) Thus, the Court adopts Broadcom's proposed construction but modifies it to match the broadest dictionary definition, found in the OED, which is "an instrument combining a radio transmitter and a radio receiver."

b. '366 and '311 Patents

Each of these patents teaches "bridging nodes" "having" transceivers. ('366 patent, col. 20, ll. 44-46, col. 21, ll. 57-59; '311 patent, col. 21, ll. 5-7.) As with the '771 patent, Agere cites

[36] The Court conceives of a device, such as a handheld scanner, wherein the transmitting portion of the transceiver is physically located inside the scanner while the receiving portion is, for example, clipped to the user's belt and attached by a wire to the rest of the device. Such a design would appear to satisfy Broadcom's definition of transceiver but not Agere's, but there is no indication, other than the fact that it is not a preferred embodiment, that this design would be excluded from the patent.

portions of the specifications referring to "transceiver units" for the proposition that transceivers must be "unitary," and therefore share common housing and circuitry. As discussed above, the Court finds this argument unpersuasive both because it relies on preferred embodiments and because the word "unit" does not necessarily imply that the receiving and transmitting elements themselves are contained *within* the same physical structure, as opposed to being *connected to* the same structure. Thus, the Court adopts the broader construction of transceiver for these patents as well.

8. "Base station" ('771, Claims 1, 2, 3, 4)

The parties agree that "base station" had a customary meaning to a person of skill in the art at the time of patenting. Agere argues that this meaning is "an interior node used for extending the range of a controller," while Broadcom argues for "an element in a network that repeats data messages and provides access to the infrastructure."

Agere proffers two arguments in support of its construction. First, Agere notes that the patentee explicitly defined "base station" using Agere's definition. ('771 patent, col. 30, ll. 35-36 ("A 'base station' device is used as an interior node for extending the range of a controller.").) This specification, however, appears only in the context of "an alternate preferred embodiment." (*Id.*, col. 30, l. 29.)[37] In contrast, no other specification makes mention of the alleged "extending the range" function of a base station. For example, Agere cites to the summary of the invention, which states that "base transceiver units" are "linked" to a host computer by a "network controller." (*Id.*, col. 3, ll. 39-44.) Even assuming that "base transceiver units" are "base stations," this language is

[37] Agere relies upon the "quote/unquote" convention to establish the definitional nature of the quoted language. This argument fails, however, because it would be improper to extend this definition beyond the embodiment in which it appears given that the other uses of the term in the specifications are not necessarily consistent with this definition, as discussed below.

ambiguous at best. It could mean that the base stations relay messages from the wireless terminal to the wired network (as Broadcom suggests), or, by implication, that the base stations provide added range for the transmissions of the network controller (as Agere argues), or both. This ambiguity is equally evident in the Background of the Invention cited by Agere, which says nothing whatsoever about the "range" of the controller. (*See id.*, col. 1, l. 65-col. 2, l. 9.)[38] Accordingly, there is no basis in the specifications for holding that the broad claim term is defined by its use in a single embodiment because the specifications as a whole show no intent to so define the term.

Second, Agere cites Dr. Goodman, who testified that a person of skill in the art would understand the term to have Agere's proposed construction. None of the evidence cited by Dr. Goodman, however, supports Agere's construction. For example, Dr. Goodman cites his own 1991 paper for the proposition that "[a] base station exchanges radio signals with wireless terminals. . . . [T]he cellular switch ***controls*** the assignment of radio channels to wireless terminals." (Goodman Rep. ¶ 171.) Several unsupported inferential leaps would be required for this language to lead to the conclusion Agere wishes the Court to adopt, namely that a cellular switch is a "controller" and that the base station "extends the range" of that controller. Similarly, the specification cited by Dr. Goodman stating that "base transceiver units . . . are . . . communicative with [the] network controller" ('771 patent, col. 9, ll. 7-12) does not directly bear on whether base stations extend the range of the controller. Thus, the Court finds that Dr. Goodman's testimony is unsupported by the evidence on which he relies, and therefore the only support for Agere's construction is a definition applicable solely to one preferred embodiment. Accordingly, this construction is rejected as without

[38] A separate portion of the Background of the Invention discusses the range of the base stations, but this is in the context of reducing problems that arise from having too many or too few base stations, rather than of increasing the range of a controller. (*See id.*, col. 2, l. 51-col. 3, l. 32.)

sufficient basis in the claim language, specifications, or extrinsic record.

In contrast, Broadcom's proposed construction is consistent with the specifications and supported by extrinsic evidence. Indeed, it appears beyond dispute that base stations both relay information to wireless terminals and give those terminals access to the hard-wired portion of the network. (*See, e.g.*, *id.*, col. 2, ll. 54-57 (discussing base station functions in "basic" network configurations), col. 3, ll. 39-44 (describing base stations as "linked" to network and "communicative with" mobile terminals); Acampora Rep. at 8 (citing IEEE dictionary definition of base station as "land-station in land-mobile service carrying on a radio communication . . . with mobile . . . radio stations").)[39] Thus, the Court credits Dr. Acampora's testimony that Broadcom's proposed construction is the customary meaning of "base station" and adopts that construction as consistent with the patent specifications.

9. "Data collection system" ('771, Claim 1)

There are two disputes regarding this term. First, Broadcom argues that the term is plain on its face—a system that collects data—and need not be construed. By contrast, Agere asks the Court to adopt a lengthy construction that combines dictionary definitions of "data," "collect," and "system" into one twenty-six-word sentence.[40] Agere does not even argue, however, that (1) the term has any meaning beyond that found in lay dictionaries, (2) the aggregate dictionary definition adds

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[39] Agere argues that Broadcom's construction is improper because it defines a base station to be synonymous with a "repeater." This argument, however, is contradicted by Agere's own expert, who opined, in the context of the term "bridging node," that a repeater is a device that "extend[s] the length of the network media." (Goodman Rep. ¶ 133.) Thus, if anything, it is *Agere's* definition ("a base station . . . extend[s] the range of a controller") that appears similar to the definition of a repeater.

[40] "A group of interacting mechanical or electrical components specifically designed to gather information external to the terminal and to bring the information together in a group."

any clarity to the interpretation of the term, or (3) a layperson's understanding would be different from that of a skilled artisan. Accordingly, the Court credits Dr. Acampora's testimony that this term is understood by persons of skill in the art to have its lay definition. Accordingly, the Court finds that the term "data collection system" is plain on its face and need not be construed. *See W.E. Hall*, 370 F.3d at 1350.

Second, the parties dispute whether certain devices—personal computers, pagers, and "substantially similar devices"—are excluded from the term by the prosecution history. As the Federal Circuit has explained, the scope of a term may be limited if "the applicant clearly and unambiguously disclaimed or disavowed any interpretation during prosecution in order to obtain claim allowance." *Middleton, Inc. v. Minn. Mining & Mfg. Co.*, 311 F.3d 1384, 1388 (Fed. Cir. 2002) (internal quotations and alterations omitted). The prosecution history of the '771 patent discloses that the Examiner initially rejected the application on the basis of U.S. Patent Nos. 5,241,542 ("Natarajan") and 5,283,568 ("Asai"). The Examiner first stated that the application was unpatentable because Natarajan disclosed:

> a radio communication system containing . . . roaming terminals . . . which . . . each have a power supply and selectively communicate with the base stations. Also disclosed is the roaming terminals maintaining the radio frequency transceiver energized for selected time intervals and turning off the transceiver after completion of the transmission. Natarajan et al. does not disclose the remote terminals as specifically being a data collection terminal, such as a code reader. However, since Natarajan et al. disclose the terminals as being data transmission terminals, then it would have been obvious to one having ordinary skill in the art to apply this technique in a data collection environment . . . .

(Agere Resp. Ex. 32 at 2-3 (Letter rejecting application 08/545,108, Nov. 13, 1996).) In a second rejection, the Examiner clarified that the obviousness of applying Natarajan to data collection systems was shown by Asai, which "discloses a data collection device, or pager, reducing the clock

rate when not gathering data." (Agere Resp. Ex. 34 at 4 (Letter rejecting application 08/545,108, July 23, 1997).) Both of these grounds were reaffirmed by the Examiner in a third rejection. (Agere Resp. Ex. 35 at 2-4 (Letter rejecting application 08/545,108, April 3, 1998).) In response to the third rejection, the applicant wrote that neither Natarajan nor Asai disclosed data collection systems similar to those described in the application. Specifically, he wrote that:

> Applicant respectfully traverses the . . . rejection of claims . . . based on Natarajan in view of Asai. . . . In contradistinction [to the application], Natarajan[41] does not show or involve data collection systems . . . . Asai concerns radio pagers, which are not data collection systems operational within a premises along with one or more base stations . . . . Further, the radio pager of Asai does not receive messages independent of wireless reception. . . . Thus, Asai alone or as combined with Natarajan proves deficient.

(Agere Resp. Ex. 37 at 5 (Applicant's Amendment of August 6, 1998).)

Despite the complexity of the parties' arguments, this prosecution history is relatively clear. Neither the Examiner nor the applicant ever stated that Natarajan disclosed a data collection system, and so there is no disclaimer of the devices taught by Natarajan, such as personal computers. *See Middleton*, 311 F.3d at 1388 (noting that prosecution history may limit term where applicant narrows term "in order to obtain claim allowance"). In contrast, the Examiner did state that Asai disclosed a data collection system. The applicant disagreed with this assessment, arguing instead that Asai taught radio pagers, which "are not data collection systems" as that term was used in the '771 patent. It seems indisputable that, by distinguishing the prior art on the grounds that radio pagers "are not

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[41] Broadcom argues that this reference to Natarajan is an error, and that it should refer to Asai. The first and last sentences of the excerpt, however, demonstrate the that there is no error, for if the reference to Natarajan were changed, the entire section would make no mention whatsoever of Natarajan, despite explicitly stating at its beginning and end that Asai *and* Natarajan were distinguishable. The Court does not believe that the applicant would twice state that Natarajan was inapposite, yet fail to state how. At the very least, the alleged error is far from the level of obviousness that might cause the Court to disregard the plain text of an evidentiary submission.

data collection systems," the applicant "clearly and unambiguously" excluded radio pagers from the scope of the term in order to obtain claim allowance.[42] Therefore, in light of this disclaimer, the Court finds that the term "data collection system" does not include radio pagers.

10. "Pending message list" ('771, Claims 1, 2)

This dispute concerns whether the "pending message list" is a notification to the roaming terminal that it needs to request transmission of its pending messages, as Broadcom argues, or also contains the text of those messages, as Agere argues. Agere claims that the dictionary definition of "list" is "an item-by-item series," and therefore a "pending message list," as understood by a person of ordinary skill in the art, is an "item-by-item series of pending messages." The Court notes, however, that the word "list" has other dictionary definitions, many of which do not support Agere's construction. For example, Webster's dictionary defines a list as "(a) a simple series of words or numerals . . . (b) [synonymous with] index, catalog, checklist . . . (c) the total number to be considered or included." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1320 (1993). All of these definitions would tend to limit the pending message list to an "index" of pending messages, rather than the messages themselves. Thus, at best, there is ambiguity among dictionaries as to which party's construction is accurate. As discussed previously, Courts faced with such ambiguity consult the specifications and prosecution history to determine which definition is most consistent

[42] Broadcom argues that only certain radio pagers, i.e., those which neither "operat[e] within a premises along with one or more base stations" nor "receive messages independent of wireless reception," are excluded. The Court disagrees because of the applicant's statement that Asai disclosed "radio pagers, *which* [differ from the application]." If the applicant had stated that Asai disclosed "radio pagers *that* [differ from the application]," the Court might agree that only the type of radio pager specifically mentioned in Asai was disclaimed. Because the "which" phrasing, however, was used, the Court finds that, as a matter of general grammatical construction, the applicant's disclaimer refers to radio pagers in general.

with the patent's use of the term.

Agere cites three pieces of evidence in support of its construction. First, one specification states that "[p]ending messages for [roaming] terminals are stored in lists in the parent node." ('771 patent, col. 34, ll. 35-38.) As Dr. Goodman conceded, however, this specification refers to messages stored on the parent node, not to the "pending message list" transmitted to the roaming terminal. (R. at 74-75 (May 6, 2004).) As there is no indication or evidence that these two lists are the same, the cited language has no apparent bearing on the term at issue. Second, Agere cites a specification that refers to "unsolicited messages" being sent to the roaming terminals ('771 patent, col. 39, ll. 44-49),[43] and argues that if the messages are sent unsolicited, they must be sent in the first transmission to the roaming terminal upon its awakening, i.e., in the pending message list. This interpretation, however, is contradicted by the same specification, which notes that the roaming terminal "must request a saved message by examining the pending message list." Thus, the text of the pending messages cannot be included in the pending message list, for if it were, there would be no subsequent "request" from the terminal.

Finally, Agere cites the prosecution history. This history shows that the Examiner rejected the application because the original phrasing of this term, "indications of pending messages," was too indefinite. (Agere Resp. Ex. 34 at 4 (Letter rejecting application 08/545,108, July 23, 1997).)[44]

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[43] Agere's brief mistakenly cites to col. 15, ll. 52-59.

[44] Agere also argues that the Examiner rejected this language on the basis of obviousness, "indications" having been taught in the Natarajan patent. (Agere Resp. Ex. 34 at 3.) The statement Agere cites for this proposition, however, is in the context of the Examiner's rejection of the "data collection system," as described above, and was not advanced as an objection to the term "indications." (*Id.*) The Examiner's only objection to "indications" was on the grounds of indefiniteness. (*Id.* at 4.)

Consequently, the applicant changed this language to "pending message list." Agere argues that the change from the indefinite "indication" to the more concrete "list" means that a list cannot merely be an indication of pending messages, and must therefore include some message content. The Court disagrees with Agere's conclusion. The word "indication" is extremely broad—it could refer to literally *anything* (e.g., a single bit, a buzzer, a flashing light) that informed the roaming terminal that it had a message pending. The term "list" is considerably narrower, specifying that the terminal is not simply being notified that messages are pending but also being given *some* information (e.g., the quantity, length, or location of the messages). There is no basis, however, for Agere's argument that this information must include message content. In other words, the applicant's amendment, while slightly narrowing the body of transmissions that could qualify as a "pending message list," does not narrow it so greatly as to require that the list actually contain a message. Accordingly, the Court finds that Agere's proposed limitation is unsupported by the specifications and the prosecution history, and the Court therefore construes the term in accordance with Broadcom's broader proposal, which is consistent with all of the specifications and prosecution history discussed above.

11. "Selectively deactivating" ('771, Claim 1)

The parties agree that "selectively" means "by choice," but they disagree as to the meaning of "deactivate," which Agere defines as "turn off" and Broadcom defines as "make inactive." Broadcom provides two dictionary definitions of "deactivate" that directly support its construction. (Broadcom Reply at 29 (citing Webster's definition, "to make inactive," and OED definition, "to render inactive or less reactive").) By contrast, Agere begins its convoluted dictionary interpretation with a definition of "activate," adds to this the definition of the prefix "de-," and then asserts, purely as an *ipse dixit*, that the resulting 'definition'—"to stop an operation"—means "to turn off." Agere

provides no explanation of why, even if its methodology were proper, the definition "to stop an operation" would support Agere's construction rather than Broadcom's. Thus, the Court finds that Agere's dictionary citations do not support its construction, and therefore the Court credits the testimony of Dr. Acampora and Broadcom's dictionary citations that the customary meaning of "deactivate" to a person of skill in the art is "to make inactive."

The specifications provide no reason to abandon the customary meaning. There is no dispute that the patent uses a variety of different phrases to refer to the transceiver when it is deactivated, including "sleep state" ('771 patent, Abstract), "dormant" (*id.*, col. 52, ll. 54-56), "powered down" (*id.*, col. 34, ll. 34-35), and "turned off" (*id.*, col. 56, ll. 9-10). Agere argues that all of these terms are synonyms meaning "turned off," while Broadcom contends that they describe various points on a spectrum of "inactive" modes. The Court finds that, at the very least, the use of these various terms leads to ambiguity, which falls far short of the "express disclaimer" that would be required to overcome the presumption in favor of the term's customary meaning. Furthermore, even if the Court were to resolve this ambiguity, it would almost certainly be resolved in Broadcom's favor. The patent Abstract, which appears to contain the only explicitly definitional reference to the term "deactivate," states that "the terminal may deactivate the transceiver, i.e., place it in a sleep state." The use of the term "sleep" to describe the transceiver's deactivation strongly suggests a mode that lies between "on" and "off," rather than the complete shut-down suggested by Agere.[45] Thus, the Court finds that the specifications are consistent with the customary meaning of the term, and

[45] The Court notes the common use of the term "sleep" to refer to the inactive, but not off, state used by laptop computers to preserve battery life. However, because the Court is uncertain regarding whether this usage is applicable to the time of the '771 patent, it is not a basis for the Court's holding.

Broadcom's proposed construction is therefore adopted.

III. CIRCUIT PATENTS

A. '802: ESD PROTECTION FOR OUTPUT BUFFERS

This patent is designed to protect integrated circuits from electrostatic discharge (ESD) by clamping voltage spikes at a certain maximum level. The patent comprises, in relevant part: (a) "a p-channel transistor and an n-channel transistor having their drains coupled" to the circuit's output buffer; and (b) "voltage clamping means" connected to the circuit's bondpad.

1. "Voltage clamping means" (Claim 1)

First, the Court must determine whether Broadcom is correct in arguing that this is a means-plus-function term governed by 29 U.S.C. § 112 ¶ 6. Agere concedes that the use of the word "means" raises a rebuttable presumption that ¶ 6 applies and that, in order to overcome this presumption, Agere must show that the claim text details sufficient "structure, material, or acts" to perform the voltage-clamping function. *Micro Chem.*, 194 F.3d at 1257. Agere argues that the term "voltage clamping" itself provides a sufficient structural description, in that "voltage clamping" is commonly understood by persons of skill in the art to refer to a particular structure. This argument, however, is contrary to the testimony of Agere's own expert, Dr. Blalock, who testified that the term "voltage clamp" has no particular structure and that, in fact, a "complete definition" of a voltage clamp would also require a "schematic" of that clamp. (R. at 164-65 (May 7, 2004); *see also* Fair '802 Rep. ¶ 42 ("The term . . . 'voltage clamping means' does not evoke a particular structure or classes of structures to perform [the] voltage limiting function.").) It is undisputed that the claim text at issue does not set forth any such schematic. The Court finds, therefore, that the claim text does

not detail sufficient structure to rebut the presumption that ¶ 6 applies. *See Unidynamics Corp. v. Automatic Prods. Int'l, Ltd.*, 157 F.3d 1311, 1319 (Fed. Cir. 1998) (holding that word "spring" in term "spring means" did not set out sufficient structure to overcome presumption in favor of ¶ 6); *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1535-36 (Fed. Cir. 1991) (reversing district court holding that ¶ 6 did not apply to means term where term at issue contained structural language but did not set out structure of relevant device).

Having determined that ¶ 6 applies, the Court must determine: (a) the function served by the term; and (b) the structure used to accomplish that function. Regarding the first inquiry, Agere argues that the function is to clamp voltage "across a semiconductor device"; Broadcom claims that the function is to clamp voltage "across the output buffer." Neither of these proposed functions, however, is found in the claim text. The Federal Circuit has held that ¶ 6 "does not permit limitation of a means-plus-function claim by adopting a function different from that *explicitly* recited in the claim." *Micro Chem*, 194 F.3d at 1258 (emphasis added) (reversing district court's determination that function of means-plus-function term was limited where no such limiting language appeared in claim); *see also Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001) (*citing Micro Chem*). Thus, the Court rejects both proposed functions and holds instead that the function of the voltage clamping means is simply "to clamp voltage."[46]

Finally, the Court must determine the structure that corresponds to the function. Agere's

[46] Notwithstanding Federal Circuit strictures, it is clear that Broadcom's proposed function is more in line with the specifications, which repeatedly refer to the protection of output buffers from electrostatic discharge. (*See* '802 patent, col. 2, ll. 2-5 ("I have invented a . . . technique wherein output buffers are protected from electrostatic discharge."), col. 1, ll. 9-11 (describing "an integrated circuit having an output buffer with improved protection against electrostatic discharge").) Agere provides no evidence supporting this aspect of its construction.

expert appears to argue that all types of voltage clamps should be deemed corresponding structures because a person of ordinary skill in the art would understand the patent to refer to all of them. (*See* Blalock Rep. ¶ 18.) This argument is contrary to the plain text of ¶ 6, which limits means-plus-function terms to the structures set out in the specifications. 35 U.S.C. § 112 ("[The] claim shall be construed to cover the corresponding structure . . . described in the specification and equivalents thereof."); *see Laitram*, 939 F.2d at 1536 ("[A] means clause does not cover every means for performing the specified function."). Broadcom identifies voltage clamps in figures 1 and 3 and in the specifications at col. 2, l. 65-col. 3, l. 12 and at col. 4, ll. 65-67. (Broadcom Resp. at 89.) Agere agrees that these are corresponding structures and also identifies the reference to a "voltage clamping device" in col. 2, ll. 5-6 as another such structure. (*See* Blalock Rep. ¶ 19.) Although Broadcom seeks to exclude this structural reference, the language of col. 2, ll. 5-6 is indistinguishable from that of col. 4, ll. 65-67, which Broadcom seeks to include in the construction.[47] Thus, the Court finds that figures 1 and 3 and all three of the textual references noted above constitute corresponding structures.

2. "Output buffer having a p-channel transistor and an n-channel transistor" (Claim 1)

Agere argues that the Court should find that this term is clear on its face and not in need of construction, while Broadcom argues that it should be construed as a device "known as a push-pull output buffer." Agere's expert, Dr. Blalock, testified that a person of ordinary skill in the art would understand this term to be self-explanatory. (*See* Blalock Rep. ¶ 21.) Broadcom's expert, Dr. Fair,

[47] Confusingly, Broadcom's expert argues that col. 4, ll. 65-67 does not describe a corresponding structure, while Broadcom's brief specifically proposes this text as such. (Broadcom Resp. at 89.) The Court assumes that Broadcom abandoned its expert's argument by proposing a construction contrary thereto.

disagrees with this assessment, arguing instead that a person of ordinary skill in the art would understand the claim to describe only a push-pull output buffer because that is the only type of output buffer described in the specifications. (Fair '802 Rep. ¶ 39.) Under Federal Circuit law, however, a claim term cannot be limited to its preferred embodiments absent evidence of a "clear disclaimer." *See In re Am. Acad. of Sci. Tech Cent.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004). Broadcom points to no evidence showing such a disclaimer. By contrast, Agere correctly notes, and Broadcom's expert agrees, that the patent does not contain language limiting the claim either to the specified embodiments or to push-pull buffers. (R. at 144 (May 7, 2004) ("It's a fact that [a structure drafted pursuant to the claim text] doesn't need to be a push-pull buffer . . . .") (Fair).) Thus, the Court declines to adopt Dr. Fair's limitation. Furthermore, in the absence of any other evidence contrary to Dr. Blalock's testimony that a skilled artisan would understand the term at issue without further construction, the Court finds that the term's customary meaning is self-explanatory.

Given that the term has a customary meaning to one of skill in the art, Broadcom can only prevail on its construction by showing that the patentee "manifestly" defined the term differently than the customary meaning. *Teleflex*, 299 F.3d at 1325. In support of this argument, Broadcom provides two rationales. First, Broadcom repeats its argument that all of the embodiments of the patent described in the specifications show push-pull buffers. (*See* R. at 141-42 (May 7, 2004) (introducing expert testimony that push-pull buffers are "preferred and only embodiments" of claim in specifications).) As stated above, however, there is no basis for limiting this claim term to its specified embodiments. Second, Broadcom argues that the device simply would not work on any type of output buffer other than a push-pull buffer. Agere's expert, Dr. Blalock, disputes this claim as a technical matter, testifying that a person of skill in the art could design a non–push-pull buffer

that would function properly with the patent. (Blalock Rep. ¶ 21.) Broadcom's expert does not entirely dispute Dr. Blalock's testimony, noting instead that while it would be theoretically possible to use the patent with a non–push-pull buffer, there is "no guarantee" that such an implementation would function properly, and "substantial experimentation" would be needed to determine whether it would suffice. (R. at 144-45 (May 7, 2004).) The Court does not find Dr. Blalock's testimony sufficient to require limiting an otherwise clear and broad claim term, for it is not the patentee's burden to demonstrate every conceivable embodiment of the patent in order to avoid judicial narrowing of the claim. *See Netword, LLC v. Centraal Corp.*, 242 F.3d 1347, 1352 (Fed. Cir. 2001) (noting that specifications "need not present every embodiment or permutation of the invention"). Stated differently, the mere fact that there is "no guarantee" that the device would work with other types of buffers is not a "manifest exclusion" that would limit a broad claim term to a single embodiment thereof. Accordingly, the Court rejects Broadcom's proposed construction and agrees with Agere that this term is not in need of construction.

B. '817: BANDGAP VOLTAGE REFERENCE GENERATOR

This patent describes a device that generates a relatively constant electrical output known as a bandgap voltage. According to the patent, the "bandgap voltage supply circuit" receives regulated electrical input from a battery and, in response, produces both the bandgap voltage and an additional output. This additional output is sent to an "amplifier circuit," which amplifies the output and uses it to operate the "voltage regulator" that regulates the voltage input from the battery to the bandgap voltage supply circuit. This recycling of what would otherwise be wasted output from the bandgap voltage supply circuit reduces the drain on the main power supply, thereby extending the battery life of the device.

1. "Bandgap voltage supply circuit" (Claim 11)

The primary dispute regarding this term concerns whether it should be construed as including a limitation that the bandgap voltage reference supply circuit have "virtually no power supply rejection," i.e., a low power supply rejection ratio ("PSRR").[48] Because this limitation does not appear in the claim text, the Court may not read it into the construction unless the specifications "express a manifest exclusion or restriction." *Am. Acad. of Sci. Tech Cent.*, 367 F.3d at 1369.

It is clear that the instant specifications express a "manifest restriction" regarding low PSRR. Specifically, the summary of the invention states that the bandgap voltage reference supply circuit "has virtually no PSRR. . . . *[I]t is precisely this low PSRR bandgap voltage reference that allows the bandgap voltage generator of the present invention to operate with such a low power supply voltage*." ('817 patent, col. 2, ll. 34-38 (emphasis added); *see also id.*, Abstract (describing invention as bandgap voltage supply circuit "which has virtually no [PSRR]"), col. 2, ll. 2-3 (same).) Therefore, because it is undisputed that the primary advantage of the patent is its ability to operate with a low power supply voltage, and because the specifications explicitly state that this low power supply voltage is made possible by the low PSRR, the Court finds that the patent presents a "manifest restriction" that requires the bandgap voltage reference supply circuit to have "virtually

[48] The parties also disagree regarding whether the term has an ordinary meaning to one skilled in the art. (Allen '817 Rep. at 8; Blalock Rep. ¶ 49.) Because the Court finds, however, that the specifications explicitly limit the claim term, the Court need not resolve this dispute, for even if Agere is correct that there is an ordinary meaning, the Court would find that the patentee "acted as his own lexicographer" in restricting that meaning. *See Int'l Rectifier*, 361 F.3d at 1373 (holding that patentee gave own meaning to term at issue, thereby "trump[ing] the ordinary and customary meaning that otherwise would have attached").

no PSRR."[49] *See Phillips v. AWH Corp.*, 363 F.3d 1207, 1213 (Fed. Cir. 2004) (holding that specifications limited claim language where they disclosed that entire invention was based upon particular embodiment of claim term); *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1348 (Fed. Cir. 2004) (finding claim term limited by specifications where summary of invention and other specifications all used limiting language in reference to patent as a whole).[50]

2. "Amplifier circuit" (Claim 11)

The only significant dispute regarding this term is whether it is a means-plus-function term governed by ¶ 6. Because the word "means" is not used, there is a presumption that ¶ 6 does not apply, and this presumption may be overcome only by showing that the term "relies on . . . functional terms rather than structure or material to describe performance of the claimed function." *Micro Chem*, 194 F.3d at 1250. Broadcom argues that the term is functional, as opposed to structural, because there are many different types of amplifier circuits. In effect, Broadcom suggests that ¶ 6 applies because rather than describing a device, the claim term instead encompasses a number of possible devices that share nothing more than a common function. (*See* Allen '817 Rep. at 9-10.) This argument, however, is unsupported by Federal Circuit precedent, under which the mere fact that a claim term cannot be linked to a single structure is insufficient to overcome the presumption against the application of ¶ 6. *See Linear Tech. Corp. v. Impala Linear Corp.*, --- F.3d ---, 2004 WL

[49] Agere's claim that the specifications cited by Broadcom refer to a preferred embodiment of the patent is incorrect. The relevant text is found in the summary of the invention and refers to the patent as a whole, not to a specific embodiment.

[50] In a dispute that the parties did not brief, Agere's proposed construction includes a fairly lengthy description of the function of the term taken directly from the claim text, while Broadcom's construction omits any such description. At oral argument, however, Agere agreed to omit this functional language from the construction. (R. at 227-28 (May 7, 2004).)

1351181, 2004 U.S. App. LEXIS 11882 (Fed. Cir. June 17, 2004) (reversing district court determination that "circuit" was means-plus-function term); *Phillips*, 363 F.3d at 1212 (holding that broad term "baffle" had ordinary meaning encompassing "sufficient recitation of structure," and that "[i]ts particular structure is not relevant"); *Personalized Media Communications, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 704 (Fed. Cir. 1998) (holding that "digital detector" is not means-plus-function term because "detector" is not "a generic structural term such as 'means,' 'element,' or 'device' [or] . . . lacking a clear meaning, such as 'widget'"); *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996) (reversing district court's determination that ¶ 6 applied to non-means term that did not invoke "a single well-defined structure"). Indeed, if Broadcom's position were an accurate reflection of the law, no patentee could use common, well-understood claim terms with multiple physical manifestations without being subject to ¶ 6. This is clearly not the manner in which the Federal Circuit has interpreted the statute, and, accordingly, the Court finds that the term "amplifier circuit" is not "functional" language that would overcome the presumption against the application of ¶ 6. Thus, because there do not appear to be any other disputes regarding this term, Agere's proposed construction is adopted.

3. "Voltage Regulator" (Claim 11)

There are two disputes regarding the construction of this term. First, the parties engage in the identical dispute to that described above regarding "amplifier circuit," with Broadcom arguing for the application of ¶ 6 on the grounds that there are many different physical manifestations of voltage regulators. For the reasons stated above, the Court rejects this contention and holds that the term is not governed by ¶ 6.

Second, Broadcom objects to Agere's construction of the voltage regulator as a device that

"controls the voltage supplied to the input of the bandgap voltage supply circuit by the power source so as to maintain the output bandgap voltage between 1.0 and 1.5 volts." Broadcom argues that this language is "vague," in that it could be read to imply, incorrectly, that the voltage regulator directly controls the output bandgap voltage instead of merely regulating its own output. (R. at 239, 245 (May 7, 2004).) The Court notes, however, that Agere's construction is taken verbatim from the claim itself ('817 patent, col. 7, l. 21-col. 8, l. 2) and, rather than being vague, states unequivocally that the voltage regulator controls the voltage "supplied to . . . the bandgap voltage supply circuit by the power source." Thus, there is no question that the voltage regulator directly controls the input to, and not the output from, the bandgap voltage supply circuit, and therefore Broadcom's vagueness argument is meritless. Accordingly, the Court adopts Agere's construction.

C. '782: COMPOUND CURRENT MIRROR

A current mirror is an electrical component used to "copy" an electrical current. This patent teaches, in relevant part, a current mirror that can function with a lower minimum input voltage than that required by similar devices at the time of patenting.

1. "Means for supplying output current" (Claim 1)

The parties agree that: (a) this is a means-plus-function term governed by ¶ 6; (b) the function is to supply output current in the current paths of the output transistors; and (c) the corresponding structure is the output node (I_{OUT}) and the connection or lead that supplies the output current in the output current path. (Joint Submission of May 18, 2004 at 1.)

2. "Means for supplying an input current in the conduction paths" (Claim 1)

The parties agree that: (a) this is a means-plus-function term governed by ¶ 6; (b) the function

is to supply an input current in the current paths of the input transistors; and (c) the corresponding structures are current sources connected to the conduction paths.[51] (Broadcom Resp. at 97; Agere Reply at 55.)

3. "Devices for which the conduction path current is substantially proportional to the square of the minimum required voltage along the conduction path for operation in the saturated mode" (Claim 1)

The parties' only dispute regarding this term concerns whether the devices "operate in saturated mode," as Broadcom contends, or "can operate in saturated mode," as Agere argues. Broadcom's expert, Dr. Allen, specifically testified that this claim term "means that the devices operate in saturated mode."[52] (Allen '782 Rep. at 12.) Agere's expert, Dr. Blalock, does not address the instant issue at all, focusing instead on defending a construction that Agere has since abandoned.[53] (*See* Blalock Rep. ¶¶ 29-30.) Accordingly, based on Dr. Allen's uncontested testimony that a person of ordinary skill in the art would understand that the devices "operate" in

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[51] Agere's proposed construction omits the phrase "connected to the conduction paths," but because the parties state that they have no substantive dispute regarding this term, and because the inclusion of this phrase renders the construction of "input current" parallel to that of "output current," the Court adopts Broadcom's proposed construction.

[52] Agere attempts to discredit Dr. Allen by noting that he testified on cross-examination that MOS devices are not always in saturated mode. The entirety of this testimony, however, was as follows:

Q: So there are times when a MOS device is not in saturation, right?
A: Yes, that's true.

(R. at 204 (May 7, 2004).) Despite Agere's implication, this testimony has no bearing on the question at hand, which is whether MOS devices *operate* in the unsaturated mode.

[53] Agere's original proposed construction of this term was "field-effect transistors," but Agere has since abandoned this proposal and suggested instead: "the devices can operate in saturated mode and satisfy the relationship expressed as I_D is substantially proportional to: $W/L * (V_{GS} - V_T)^2$ in that mode of operation." (Joint Submission of May 18, 2004 at 2.) Broadcom's proposed construction is identical to Agere's except that it omits the word "can."

saturated mode, the Court adopts Broadcom's proposed construction.

D. '195: LOW-POWER-DISSIPATION CMOS OSCILLATOR CIRCUITS

In relevant respects, this patent teaches an oscillator circuit wherein: (a) various portions of two transistors are "directly connected" to each other; (b) other portions of these transistors are connected by "tank circuitry" or "reactive elements"; and (c) the transistors are connected to "power sources" by "additional reactive elements."

1. "Tank circuitry comprising at least one inductor and capacitors connected to said source and drain electrodes" (Claim 1)

Agere argues that this term describes a *circuit* that is connected to source and drain electrodes of MOS devices, whereas Broadcom argues that the *capacitors* of the circuit are connected to the MOS devices. It is clear that Broadcom's construction is truer to the grammatical structure of the term text. In order to adopt Agere's construction, the term would need to be read as: "Tank circuitry[,] comprising at least one inductor and capacitors[,] connected to said source and drain electrodes"; or "Tank circuitry comprising at least one inductor and capacitors [and] connected to said source and drain electrodes." Neither of these, however, is the actual claim text, as Agere tacitly acknowledges by claiming that the phrase contains "silent commas." (Agere Opening at 93.) Thus, the Court rejects Agere's proposed construction because it would require an alteration of the term at issue. *See Interactive Gift*, 256 F.3d at 1331 (noting that claim construction must "begin and remain centered on" language that patentee "chose to use").

Agere originally argued that Broadcom's construction should be rejected because it would exclude a preferred embodiment of the patent. (Agere Opening at 92-93.) After Broadcom refuted this assertion on technical grounds, however, Agere amended its argument and now claims that

Broadcom is attempting to limit the claim term to its specifications. (Agere Reply at 57-59.) In other words, having abandoned its argument that Broadcom's proposal is *in*consistent with the specifications, Agere now argues that the proposal is *too* consistent. The Court finds this argument specious, for the mere fact that a construction is consistent with the specifications does not render it an improper limitation. *Cf. Liebel-Flarsheim*, 358 F.3d at 904-05 (noting difference between interpreting terms in light of specifications and limiting terms to specifications). In the absence of any evidence or explanation concerning how the proposed construction is, in fact, a limitation of the term—and Agere provides no such evidence—the Court finds Broadcom's proposal to be entirely consistent with the claim text and the specifications. Accordingly, the Court adopts Broadcom's construction.

2. "Means directly connecting" (Claims 1, 9)

The parties agree that: (a) this is a means-plus-function term governed by ¶ 6; (b) the function is to directly cross-connect the drain and gate electrodes of the two MOS devices; and (c) the corresponding structures are the low-impedance paths between the gate and drain electrodes disclosed at col. 2, ll. 36-42, and shown in Figures 1 and 2. (Broadcom Resp. at 102.)

3. "Power sources" (Claim 9)

The parties agree that "a power source can be a voltage supply or ground potential." (Broadcom Resp. at 102.)

4. "Reactive element" (Claim 9)

The parties agree that a reactive element is "a device that behaves like an inductor or a capacitor." (Joint Submission of May 18, 2004 at 2.)

5. "Means including additional reactive elements for connecting the source and drain electrodes . . . to associated power sources" (Claim 9)

The parties agree that this is a means-plus-function term governed by ¶ 6 and that the function is to connect the source electrodes of a pair of MOS devices to an associated power source and to connect the drain electrodes of those MOS devices to a different power source. The parties further agree that the corresponding structures are low-impedance paths that include "additional reactive elements." The parties disagree, however, concerning which specific elements constitute "additional reactive elements." Agere argues that this term encompasses "inductors, capacitors, MOSFETs or other structures that provide electrical reactance," while Broadcom argues the term includes elements "such as capacitors and inductors." Both parties note that this dispute hinges upon the construction of the term "reactive element," as discussed above. Therefore, because the parties have agreed to define "reactive element" as "a device that behaves like an inductor or a capacitor," *supra* Part III.D.4, the Court will simply apply this definition to the instant term. Accordingly, the corresponding structures in the specifications are the "low-impedance paths that include additional reactive elements, such elements being devices that behave like inductors or capacitors." The parties agree that corresponding structures are disclosed in figure 1 and at col. 2, ll. 44-48, but the Court is unclear whether there is a dispute as to additional structures disclosed in figure 2 and at col. 2, ll. 26-33 and col. 4, ll. 38-46. Thus, the parties shall jointly determine which of these additional structures, if any, correspond to the "means including" term in light of the above constructions.

E. '432: CONTINUOUS TUNING OF SWITCHED CAPACITOR CIRCUITS USING DC-ISOLATED TUNING ELEMENTS

This patent describes a circuit that is relatively impervious to external electrical currents, thus allowing the frequency of the circuit to be adjusted continuously. This circuit contains at least one

"DC-isolated variable capacitor" comprising, inter alia, a "buffer amplifier."

1. "DC-isolated variable capacitor" (Claim 1)

The parties agree that this term should be construed as: "A variable capacitor or equivalent capacitor circuit whose capacitance is unaffected by any DC voltage or current at an input or output node of the DC-isolated variable capacitor."

2. "Buffer amplifier" (Claim 1)

The parties have narrowed their dispute regarding this term to whether a buffer amplifier must have an output impedance that is "greater" or "substantially greater" than the rest of the circuit elements. (Joint Submission of May 18, 2004 at 2.) Broadcom argues that the "substantially greater" construction is supported by Dr. Allen, who testified that this particular patent would not function properly unless the buffer amplifier's output impedance were at least ten times greater than that of the other circuit elements. (R. at 215 (May 7, 2004).) Agere responds that this interpretation is based upon specific embodiments of the patent and is therefore an improper limitation of the claim text.

The Court finds that even if Dr. Allen's testimony is assumed, arguendo, to be accurate, it does not establish that the buffer amplifier's output impedance must be "substantially greater" than that of the rest of the circuit. There is no evidence on record concerning whether a factor of ten constitutes "substantially greater" impedance to a person of ordinary skill in the art. Stated differently, although Broadcom's expert testified that a low-impedance buffer would not function properly in this patent and that a certain impedance differential is necessary, Broadcom provides no

evidence that this specified differential is "substantial" in the eyes of a person skilled in the art.[54] Thus, the Court rejects Broadcom's proposed construction because it is without evidentiary basis in the record and adopts the remainder of the parties' proposed constructions, which are identical.[55]

F. '194: CURRENT-CONTROLLED CMOS LOGIC FAMILY[56]

This patent describes a data-processing device in which functions are divided among "conventional CMOS logic" and "C^3MOS logic." Of these two, CMOS logic is slower, but it has the advantage of using less electricity because it does not have a constant electrical flow and dissipates "substantially zero static current." C^3MOS, by contrast, uses "current steering" technology to maintain a constant flow of current, thereby enabling the logic to process information more quickly but also using more electricity. The combination of C^3MOS and CMOS logic within a single device is used to optimize the balance between speed and energy consumption by allocating more complex tasks to the C^3MOS logic and simpler tasks to the CMOS logic. The patented circuit comprises "first circuitry," which is implemented using C^3MOS logic and is configured to "serialize" data, and "second circuitry," which is implemented using CMOS logic and is "coupled to" the first circuitry.

1. "Current-controlled complementary metal oxide semiconductor C^3MOS logic"

This dispute concerns whether C^3MOS logic is fabricated "using CMOS processes" only, as

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[54] In fact, shortly after testifying that a factor of ten is necessary, Dr. Allen testified: "So, you have to have a *higher output impedance* buffer for this thing to work." (*Id*. at 217 (emphasis added).) This is basically the language of Agere's proposed construction.

[55] In light of this holding, the Court does not reach Agere's argument that Dr. Allen's construction is an improper attempt to limit the claim to a single embodiment.

[56] All disputed terms in the '194 patent are found in claim 17.

Broadcom asserts, or "using MOSFETs" (encompassing both CMOS and BiCMOS processes), as Agere claims. Importantly, both Broadcom's expert, Dr. Fair, and Agere's expert, Dr. Blalock, testified that C^3MOS logic is made using CMOS processes. (Fair '194 Rep. ¶ 37; Blalock Rep. ¶ 57.) Agere provides no expert evidence in support of its position, relying instead on a vague citation to a technical paper stating that BiCMOS, which combines bipolar and CMOS technologies on the same chip, is "probably" "the technology of the future." KENNETH R. LAKER & WILLY M.C. SANSEN, DESIGN OF ANALOG INTEGRATED CIRCUITS AND SYSTEMS 156 (1994). Broadcom responds, correctly, that this citation has little to do with the instant dispute, in that it does not refute the testimony of the two expert witnesses. Thus, the Court finds that Broadcom's proposed construction accurately reflects the understanding of persons of ordinary skill in the art, and that construction is therefore adopted.

2. "Current steering"

The parties agree that "current steering" means "directing a substantially constant current flow into one of two or more branches in response to differential input signals."

3. "Serialize"

This dispute, along with that regarding "first circuitry" and "second circuitry," below, concerns primarily whether all serialization and deserialization functions are performed by the first circuitry, as Agere contends, or whether some such functions can also be performed by the second circuitry, as Broadcom argues. Agere's argument focuses on the fact that all of the embodiments described in the specifications teach that the first circuitry deserializes signals for processing by the second circuitry and then reserializes the signals after they are processed. Broadcom counters that the specifications note the possibility of multi-stage deserialization, with the first step being

performed by the first circuitry, and subsequent steps performed by the second circuitry.

An examination of the claim text demonstrates that Agere's interpretation is an attempt to limit the broader claim language to its preferred embodiments. Claim 17 states that: (a) the first circuitry "processes" a "first signal having a first frequency"; (b) the second circuitry "processes" a "plurality of second signals having a second frequency that is lower than the first frequency"; and (c) the first circuitry "serialize[s] the second plurality of signals into a single output." ('194 patent, col. 11-12.) Although there is no debate among the parties that one of the functions of the first circuitry is to deserialize the input signal, claim 17 does not specifically denote deserialization as a function of the first circuitry. Instead, the claim states that the first circuitry "processes" the input. Thus, the term "process" must include deserialization as a form of processing. (*See id.*, Figs. 11-12 (showing first circuitry deserializing input).) Because the term "process" is also used to describe the functioning of the second circuitry, and because that term should be given the same meaning each time it is used in the claim, *Rexnord*, 274 F.3d at 1342 ("[A] claim term should be construed consistently with its appearance in other places in the same claim or in other claims of the same patent.") (collecting cases), the second circuitry's "processing" must also be able to include some deserialization functions. Furthermore, the claim language indicates that the second circuitry's deserializing function must be accompanied by a serializing counterpart: Because the first circuitry is specifically described as serializing "*the* second plurality of signals"—i.e., the signals produced by the first circuitry—the output of the first circuitry deserializer must be the same "plurality of signals" as the input to the first circuitry serializer, which means that any signals deserialized by the second circuitry must be re-serialized by the second circuitry before being passed on to the first circuitry serializer. In total, therefore, the claim text allows for both deserialization and serialization

to occur in the second circuitry. Although Agere appears to be correct in claiming that the specifications only discuss serialization as a first-circuitry function,[57] the Court will not read an implicit limitation from the specifications into broader claim text. *Am. Acad. of Sci. Tech Cent.*, 367 F.3d at 1369 (requiring "clear disclaimer" in specifications to limit claim term). Agere's construction is accordingly rejected.[58]

The second issue relevant to this claim term is whether the data to be serialized must be in "parallel" streams, as Agere claims, or simply "multiple" streams, as Broadcom argues. Broadcom cites its expert, Dr. Fair, who testified that the industry definition of serialize, as found in the IEEE dictionary, refers only to multiple streams of data. (Fair '194 Rep. ¶¶ 44-46.) Dr. Fair's testimony that a person of ordinary skill would not understand "serialize" as necessarily connoting parallel input is unrebutted. Therefore, the Court must adopt Broadcom's definition unless Agere can show

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[57] Because the Court rejects Agere's contention on textual grounds, the Court need not address Broadcom's claim that the specifications actually contemplate CMOS serialization. However, the Court notes that the language Broadcom cites to support this contention ('194 patent, col. 7, ll. 61-63) states that each stream of data output by the deserializer "will require its own signal processing circuitry" (*id.*, col. 8, ll. 1-2), but that because this signal processing circuitry "is implemented in conventional CMOS logic" (i.e., the second circuitry), the increase in signal processing circuitry will not increase the device's current dissipation (*id.*, col. 7, ll. 61-63). This language not only fails to support Broadcom's argument but actually weakens it, in that the specification contemplates a set of second circuitry for each parallel signal, rather than second circuitry that itself deserializes signals into parallel streams.

[58] Agere's makes the secondary argument that the term "a second frequency" necessarily means "one single frequency," which would imply that all the data processed by the second circuitry is at a constant frequency and therefore not deserialized within that circuitry. This argument, however, is untenable under Federal Circuit caselaw, which generally discourages courts from reading the word "a" to mean "only one." *See Scanner Tech. Corp. v. ICOS Vision Sys. Corp., N.V.*, 365 F.3d 1299, 1304 (Fed. Cir. 2004) ("To limit the claim term 'an illumination apparatus' to one illumination source, we require much stronger evidence of the patentees' intent than strained extrapolation from . . . language employed [elsewhere in the patent]."); (*see also* R. at 268 (May 7, 2004) ("I would imagine that, as long as you have that one, you could have something else.") (Agere's Counsel); *but cf. supra* Part II.B.5 (discussing claim in which context limits "a" to "one").

that the patentee was "acting as his own lexicographer."

Agere argues that the patentee specifically used the word "serialize" to refer to "parallel" streams in the prosecution history. The prosecution history to which Agere cites for this proposition is an amendment in which the patentee states that "[i]t is well known to those skilled in this art that a serializer . . . takes a plurality of parallel streams of data and converts it to a single stream of data." (Agere's Resp. Ex. 50 at 6 (Amendment of August 7, 2001).) Agere fails, however, to note the context of this statement. The Examiner had apparently rejected the application on the basis that prior art (the Sato patent) already taught a similar serializer, and the patentee's response, quoted above, refers to the fact that the Sato patent is a *de*serializer, not a serializer. In other words, the applicant was distinguishing his patent from Sato's on the basis that Sato converted one data stream into multiple streams, while the application converted multiple streams of data into one. The fact that the streams to be serialized might be in parallel was completely irrelevant to the patentee's argument. *See Middleton*, 311 F.3d at 1388 (noting that claim may be limited where applicant disclaimed or disavowed an interpretation "in order to obtain claim allowance"). Thus, the Court finds this portion of the prosecution history insufficient to demonstrate that the patentee acted as his own lexicographer in using the word "serialize," and Broadcom's construction, which is that understood by persons of ordinary skill in the art, is therefore adopted.

4. "First circuitry"

The parties agree that the "first circuitry" logic is comprised entirely of C^3MOS. (Joint Submission of May 18, 2004, at 3). Agere further proposes to include the following description of the functionality of the first circuitry in the construction: "Digital circuit section that functions to (I) process a first signal having a first frequency and (ii) serialize the second plurality of signals into a

single output signal." Broadcom opposes this language as an improper limitation of the claim term. The Court finds that Broadcom's objection is misplaced because Agere's proposed construction merely restates the relevant claim language. This construction is therefore permissible, except that to render it true to the claim text the words "functions to" must be replaced with "is configured to." ('194 patent, col. 11, ll. 5-6, col. 12, ll. 6-7.) The Court recognizes, however, that the word "process" is potentially ambiguous, in that Agere might later argue that it refers only to deserialization. Therefore, because the parties agree that the term "process" in the context of the second circuitry does not mean only to serialize and deserialize, and because that term should be given a consistent meaning throughout the claim, Agere may not use its construction to argue that the first circuitry is restricted to serializing and deserializing functions only.[59]

5. "Second circuitry"

As stated above regarding "first circuitry," the Court will adopt Agere's construction, modified to match the actual claim text, with the caveat that Agere may not argue that the second circuitry cannot perform any serialization or deserialization functions. To the extent that Broadcom continues to argue that the logic of the second circuitry need not be implemented entirely in CMOS, this contention has been explicitly rejected by Broadcom's own expert. (R. at 257 (May 7, 2004) (Fair).)

6. "The second circuitry being coupled to the first circuitry"

The parties agree that this term should be construed as: "The second circuitry is connected to the first circuitry such that it receives the plurality of lower-frequency second signals from the first

[59] The Court notes that as a result of the holding above regarding "serialize," Agere also may not argue that the denomination of "serialization" as a function of the first circuitry means or implies that the second circuitry performs no serialization functions.

circuitry, and provides a plurality of lower-frequency processed signals to the first circuitry."[60]

7. "Conventional complementary metal-oxide semiconductor (CMOS) logic"

The parties agree that this term should be construed as "logic circuitry formed using complementary CMOS transistors (i.e., – and p-channel transistors)."

8. "Substantially zero static current"

Broadcom proposes construing the term "substantially zero" to mean "very low," and provides expert testimony supporting its position that a person of ordinary skill in the art would understand the term in this fashion. (Fair '194 Rep. ¶¶ 59-62.) Agere proposes to construe "substantially zero" to mean "zero," thereby reading the word "substantially" out of the claim entirely, but provides no technical or evidentiary basis for doing so.[61] Indeed, if the patentee had intended to say "zero static current," he could have done so. *See Interactive Gift Exp.*, 256 F.3d at 1331 (noting that claim construction must "begin and remain centered on" language that patentee "chose to use"). Thus, the Court credits Dr. Fair's unrebutted testimony that a person of ordinary skill in the art would understand the term at issue to mean "very low static current." In total, therefore, the Court adopts Broadcom's proposed construction.

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[60] This adoption of this construction is conditioned upon Agere's representation that it will not attempt to argue that the word "connected" necessarily implies a physical connection. (Agere Resp. at 91.)

[61] In fact, Agere argues that the term "substantially zero" is so ambiguous that it could even be construed to mean "more than substantially zero" (although Agere does not actually request that the Court adopt this construction). (Agere Resp. at 92.) To the extent that Agere contends that the specifications create such ambiguity, the Court rejects this argument because it is belied by Dr. Fair's unrebutted testimony that a person of skill in the art would understand the specifications to refer to "very low" static current dissipation. (Fair '194 Rep. ¶ 62.)

IV. CODING PATENTS

A. 154: TRELLIS CODING METHOD AND ARRANGEMENT FOR FRACTIONAL BIT RATES

This patent describes a process by which data is encoded for transmission. According to the patent, one portion of the data is trellis encoded and used to identify a set of symbols that might be used for transmission, while the remainder of the data is not trellis encoded and is used to choose from the selected subset the specific symbol used for transmission.

1. "Trellis encoding ones of the aggregated bits to identify, for each of the plurality of symbols, a respective subset from which that symbol is to be chosen" (Claim 1)

The first inquiry regarding this term is whether it has a customary meaning to a person of ordinary skill in the art, as Agere asserts and Broadcom denies. Agere's expert, Dr. Fuja, testified that the patent uses this term "under its plain and ordinary meaning by one of ordinary skill in the art" (Fuja Rep. ¶ 14), and therefore no construction is required. Dr. Fuja does not, however, state or explain what the ordinary meaning is, thereby implying that a nonexpert trier-of-fact could, without any guidance from the Court, understand what this patently technical term means to a person of skill in the art. In contrast, Broadcom's expert, Dr. Heegard, denies that the term has an ordinary meaning and testifies that, in fact, it describes a process that differs from the normal functioning of a trellis encoder. (Heegard Rep. at 15.) In the face of this conflicting testimony, the Court is persuaded that the term does not have a customary meaning by the fact that Dr. Fuja does not cite or refer to a single piece of evidence supporting his conclusion.[62] When combined with expert

[62] In fact, Dr. Fuja's report does not even provide an *argument* in favor of his conclusion; he merely states, in a single sentence, that the term is used in its customary sense and then proceeds to discuss Broadcom's proposed construction. (Fuja Rep. ¶¶ 14-20.)

testimony that no customary meaning exists, the Court finds that this lack of evidence strongly indicates that the term is not customarily used by persons of skill in the art. In addition, unlike the terms "single piece," which the Federal Circuit has found to be self-explanatory, and "predetermined," which this Court has found not in need of construction, the instant term is lengthy, complicated, and, as discussed below, ambiguous. *See W.E. Hall*, 370 F.3d at 1350. Thus, the Court rejects Agere's contention that the term has a customary meaning to a person of skill in the art and does not need construction.

The second dispute concerns whether *each* aggregation of trellis-encoded bits is successively used to identify a symbol subset for *that set* of bits, or whether *multiple* sets of aggregated, trellis-encoded bits may be used together to identify a subset for *all* of these aggregations. Broadcom argues that the patent encompasses only the former process, while Agere argues that both implementations are within the scope of the claim language.

The Court agrees with Agere that the term language is, on its face, sufficiently broad to encompass both of the meanings mentioned above: The term could refer to identifying one subset per aggregation of bits, or it could refer to identifying a single subset for multiple aggregations. Thus, the Court looks to the specifications to determine if the limitation proposed by Broadcom is warranted. In support of its contention, Broadcom cites, inter alia, the summary of the invention, which states that the relevant process is performed "just as in the prior art." ('154 patent, col. 2, l. 40; *see also id.*, col. 3, ll. 19-22, 44-49.) The question, therefore, is whether the prior art was limited in the fashion that Broadcom suggests.[63]

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[63] It is not entirely clear that the "prior art" language constitutes a restriction of the claim term, as opposed to a clarification that the inventive aspect of the instant patent is not found in the subset-selection process. Nonetheless, because the Court finds that examination of the prior art does

Broadcom's expert, Dr. Heegard, testified that the prior art disclosed successive identification of subsets by trellis-encoded bits. (Heegard Rep. at 16-17; *see also* Wei Dep. at 125-26.)[64] Dr. Fuja disagrees, stating that "multiple schemes" of subset identification were known to persons of ordinary skill in the art at the time of the patent. (Fuja Rep. ¶ 19; *see also* Wei Dep. at 268.) Although Dr. Fuja's statement is vague, uncited, and identifies no identification "scheme" other than the successive method Broadcom wishes to apply, his testimony is corroborated by the specifications. Specifically, col. 14, ll. 22-31, in a section that disclaims many potential limitations of the claims by the preferred embodiments, states that "[t]he subsets associated with . . . non–trellis-encoded bits need not be subsets that are identified by the trellis encoder successively. Moreover, the bits . . . which . . . identify the subsets . . . need not have any particular time relationship to one another." This statement clearly indicates that the patentee contemplated more than one method of subset identification, and, although it does not expressly describe joint selection of multiple subsets, it belies any argument that the "prior art" language "manifestly restricts" the patent to a single identification scheme. (*See* Wei Dep. at 124 (testifying that prior art disclosed multiple trellis-

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not lead to a narrowing of the claim, the Court assumes arguendo that the "prior art" language could limit the claim.

[64] Broadcom argues that this testimony is supported by the specifications, which state that "[i]n accordance with conventional trellis-encoding practice," the trellis encoder generates bits that "define a sequence of the . . . subsets from which successive symbols . . . are to be chosen." '154 patent, col. 3, ll. 44-49. These statements, however, demonstrate no more than that successive identification is in accordance with prior art and used in the instant patent. (*See id.*, col. 3, ll. 21-43.) Because neither of these propositions is in dispute, these portions of the specifications are not helpful to construing the term at issue. Broadcom's supplemental brief, which argues forcefully that there is no non-successive identification method shown in the patent, is similarly uninstructive.

encoding processes).)[65] Stated differently, the above-cited language must be given the effect intended by the patentee, which was to disclaim potential limitations of the subset-identification process on the basis of the specified embodiments of that process. Thus, the Court rejects Broadcom's proposed construction as an improper narrowing of the claim term. Unfortunately, this leaves the Court with no proposed construction to adopt. Due to the technical complexity of this term, the Court will decline to apply its own language, noting instead only the findings above that: (a) there is no customary meaning to a person skilled in the art; and (b) the term is not limited to successive identification of symbol subsets for each set of aggregated bits.

2. "Choosing each of the plurality of symbols from their respective subsets jointly as a function of at least a particular group of the others of the aggregated bits" (Claim 1)

The parties engage in three distinct debates regarding the construction of this term. First, they disagree regarding whether the term has a plain meaning to one of ordinary skill in the art. Although Agere's expert, Dr. Fuja, provides a proposed ordinary meaning, his only basis for this definition appears to be a Webster's dictionary definition of the word "jointly." (*See* Fuja Rep. ¶ 14.) Dr. Heegard argues that the term has no ordinary meaning, and that the relevant definition cannot be determined without reference to the specifications. (Heegard Rep. at 9.)[66] Because Dr. Fuja

[65] The Court cites the testimony of Dr. Wei, inventor of the '154 patent, not to establish the intent of the patentee, *see supra* n.12, but rather to explain how a person of skill in the art would understand the claim term.

[66] Agere notes that Dr. Heegard, despite testifying that there is no customary meaning, was nonetheless able to provide definitions of each of the various portions of the term in his deposition. The Court notes that any English phrase, if broken down into single words, could be "defined" in this manner, but this does not mean that the phrase as a whole has the aggregate meaning of all its composite parts. Agere provides no evidence that such an aggregate construction would be appropriate for this term or that persons of skill in the art would understand it to be the customary meaning.

provides no explanation or support for any of his definition except the word "jointly," the Court credits Dr. Heegard's testimony and finds that a person of ordinary skill in the art would not understand the term at issue to have an ordinary meaning.

Second, Agere objects to Broadcom's proposed construction on the grounds that it contains an overly vague reference to prior art. Broadcom's construction, taken from the summary of the invention, reads as follows: "Two or more groups of non-trellis-encoded bits that would otherwise be used to independently choose symbols from respective identified subsets are, instead, used as a single group to choose all the symbols of those subsets." (*See* '154 patent, col. 2, ll. 44-49.) The Court agrees with Agere that Broadcom's definition confusingly attempts to define the claim at issue in terms of what it is not. Thus, the Court rejects the reference to prior art.

Third, Broadcom argues that the term, particularly the word "jointly," should be interpreted to require that at least one of the trellis-encoded bits be used in the choosing of more than one symbol. Agere disputes this construction as an improper limitation of the claim. As a threshold matter, the claim term "jointly" is doubly ambiguous, in that its meaning and its referent are both unclear on the face of the claim text. Regarding the term that "jointly" modifies, the claim text is unclear as to whether (a) groups of bits are *used* jointly to choose a symbol, which would support Agere's argument, or (b) multiple symbols are *chosen* jointly by groups of bits, which would support Broadcom's construction. Each side cites to the specifications to support its argument. The relevant specifications are as follows:

> [T]he particular symbols selected for transmission from two or more identified subsets are chosen by the non–trellis-encoded bits interdependently. This is, two or more groups of non–trellis-encoded bits that would otherwise be used to independently choose symbols from respective identified subsets are, instead, used as a single group to choose all the symbols of those subsets. ('154 patent, col. 2, ll.

40-48; *see also id.*, col 3., ll. 26-30.)

> In the prior art, a particular group of non–trellis-encoded bits is used to select a particular one symbol from a particular one identified subset. In accordance with the invention, however, a particular group of non–trellis-encoded bits is used to identify a plurality of symbols from a particular plurality of identified subsets interdependently. (*Id.*, col. 3, ll. 56-62; *see also id.*, col. 3, ll. 19-26.)
>
> [Referring to a preferred embodiment:] "In summary, then, it can be seen that the thirteen bits . . . do indeed jointly and interdependently identify . . . a particular one symbol from each of the four identified . . . subsets." (*Id.*, col. 5, ll. 39-43; *see also id.*, col. 3, ll. 64-65 (describing embodiment in which symbols "are chosen interdependently, or jointly").)

The first quotation above is ambiguous, in that the claim term "jointly" could be viewed as the opposite of "independently," in which case it would modify "choose" (i.e., 'to non-jointly choose'), or as a synonym for "as a single group," in which case it would describe how the "groups" are "used" (i.e., 'groups . . . used jointly to choose'). The second quotation suffers from the same ambiguity, in that it is unclear whether "interdependently"—as a synonym for "jointly"—refers to how "a particular group of bits" is "used" or to how "symbols" are "identified." The third excerpt, however, makes clear that "jointly and interdependently" modify "identify" (i.e., "choose"). (*See also id.*, col. 3, ll. 64-65 (describing embodiment in which symbols "are chosen interdependently, or jointly").) Thus, the construction of "jointly" as a modifier of "choose" finds more support in the specifications than the competing construction.[67]

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[67] The Court recognizes that its primary basis for this conclusion is derived from a preferred embodiment. As the Federal Circuit has noted, "there is sometimes a fine line between reading a claim in light of the specification and reading a limitation into the claim from the specification. In locating this 'fine line' it is useful to remember that we look to the specification to ascertain the meaning of the claim term as it is used by the inventor in the context of the entirety of his invention, and not merely to limit a claim term." *Interactive Gift*, 256 F.3d at 1334 (internal quotations and citation omitted). With regard to the instant term, the Court uses the preferred embodiment to "ascertain the meaning" of a key word in the claim, rather than to limit the claim to this embodiment.

Regarding the meaning of "jointly," the parties dispute whether it requires the choosing to be performed "together," as Agere proposes, or "interdependently," as Broadcom suggests. (*See* Broadcom Supplemental Br. at 13 (arguing that "jointly" is distinguished from "independently").) This dispute is easily resolved: As the passages quoted above illustrate, the patentee clearly used the terms "jointly" and "interdependently" as synonyms. (*See, e.g.*, *id.*, col. 3, ll. 64-65 (noting that symbols "are chosen interdependently, or jointly").)

In light of these interpretations, the claim term must be construed to indicate that the symbols chosen by the groups of non–trellis-encoded bits are chosen interdependently, and therefore that Broadcom is correct in arguing that a non–trellis-encoded bit is used to select more than one symbol. Thus, the Court adopts a modified form of Broadcom's construction that reflects this requirement and the other holdings noted above: "Symbols are jointly, or interdependently, identified from their respective subsets by a particular group of non–trellis-encoded bits."[68]

3. "Identifying signal points from successive ones of the identified 2M-dimensional subsets jointly in response to at least a particular group of the others of the input bits" (Claim 9)

The parties agree that the arguments made for the previous, parallel term are applicable here. (Broadcom Resp. at 66; Agere Opening at 65 (referring Court to arguments for "choosing" term).) Accordingly, the Court construes this term as: "Signal points are jointly, or interdependently, identified from their respective subsets by a particular group of input bits."

4. "fractional bit rate relative to the symbol rate" (Claim 1)

The parties agree that this term should be construed as "non-integral number of information

[68] Perhaps not surprisingly, this language is somewhat similar to that found at col. 3, ll. 56-62 of the specifications.

bits per 2N-dimensional symbol."

B. 551: OVERLAPPED MULTILEVEL CODES

Like the '154 patent, the '551 patent deals with data encoding. According to this patent, a first portion of "input data" is encoded to create an encoded signal, and then the first portion of that encoded signal is re-encoded along with a "second portion of the input data," thereby creating an overlapping code.

1. "Input data" (Claims 1, 11)

Broadcom argues that "input data" should be construed as "information received from an external source," which would include data sent directly to the two encoders but not data passing through the first encoder and entering the second. Agere argues for the construction "data-bearing bits," which would include all data other than output data.[69]

The claim language clearly supports Broadcom's construction. Claims 1 and 11 describe a process in which some of the "input data" is redundancy encoded "to provide a first encoded signal," and other portions of the "input data" are combined with the first portion of that "first encoded signal" using another redundancy code. This language clearly differentiates between the "input data," which is that data sent directly to the two encoders, and the "first encoded signal," which is the data sent from the first encoder to the second encoder. Agere's construction attempts to obliterate this distinction by including the "first encoded signal" within the definition of "input data."

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[69] The limitation that Agere's construction would not include output data is asserted by Agere alone and belied by the plain text of Agere's construction. Because the Court rejects this construction on other grounds, however, it need not determine whether its overbreadth is also fatal. In addition, the Court need not reach the issue of whether Agere's construction impermissibly reads the word "input" out of the claim term, but the Court notes that even Agere's own expert, Dr. Fuja, does not entirely concur with the omission of this word. (*See* Fuja Rep. ¶ 33 (defining term as "'data-bearing bits' *input into a particular system* to attain an output" (emphasis added)).

Accordingly, the Court rejects Agere's construction as inconsistent with the claim text at issue.

By contrast, Broadcom's construction maintains the distinction between "input data," i.e., data from an external source, and the "first encoded signal," which would not be input data because it is produced internally. Broadcom's construction is also supported by the testimony of Dr. Heegard and at least three dictionary definitions in effect at the time of the patent. (Heegard Rep. at 19 (citing IEEE dictionary definition as "data received from an external source," McGraw-Hill dictionary definition as "information . . . from the external world," and Webster's dictionary definition as "information fed into a computer").) Agere's expert, Dr. Fuja, provides no evidence to counter Dr. Heegard's conclusions except for a dictionary citation taken from a 2001 dictionary, nine years after the '551 patent was filed. (Fuja Rep. ¶ 33.) Accordingly, the Court credits Dr. Heegard's conclusion that a person of ordinary skill in the art would agree with Broadcom's construction, and that construction is therefore adopted.[70]

2. "Encoding a second portion of said input data" (Claims 1, 11)

Broadcom seeks to construe this term to state explicitly that the "second portion of said input data" is "not encoded using the first redundancy code," while Agere argues that the term is not in need of construction. This dispute is entirely resolved by the holding above regarding "input data." Because the Court holds that the term "input data" does not include data encoded by the first encoder (i.e., the "first encoded signal"), input data by definition is not encoded using the first redundancy

[70] In its supplemental brief, Agere appears to argue for a new construction of this term as "data received directly or indirectly from an external source." (Agere Supplemental Br. at 16.) This "directly or indirectly" language, however, is ambiguous and dodges the substantive issue at hand. In addition, the Court notes that Agere's oft-repeated argument that the data emerging from the first encoder is "mostly" or "almost entirely" input data (*id.* at 15; *see also* Wei Dep. at 174 (stating that first encoded signal "includes" input data)), fails because it would defy logic to construe the term to include this data when even Agere tacitly admits that is not *entirely* input data.

code. Because this is the only issue in dispute, and it is resolved in favor of Broadcom's construction, that construction is adopted.

C. 519: TUNABLE POST-FILTER FOR TANDEM CODERS

This patent describes a device that post-filters data that has been repeatedly encoded and decoded. The post-filter is designed to reduce the impact of distortions introduced into the transmission by the tandem-coding process.

1. "Means for decoding the encoded signal to generate a decoded signal" (Claim 6)

The parties' main dispute concerning this term is whether it is governed by ¶ 6. Agere argues that ¶ 6 does not apply because the term "means for decoding" is synonymous with the term "decoder," which has sufficient structural connotations to rebut the presumption in favor of applying ¶ 6. Broadcom argues that there are many different "means for decoding," and therefore no specific structure is implied by the claim text.

There are two reasons that Agere cannot meet its burden to overcome the presumption in favor of ¶ 6. First, regarding the question of whether "means for decoding" and "decoder" are synonyms, Agere's expert, Dr. Jayant, testified that the term "means for" is not a technical term but an exclusively legal one. (R. at 317-18 (May 7, 2004).) Thus, there would be no reason for the patentee to use this term other than to achieve the legal effect of invoking ¶ 6. Agere nonetheless asserts that the words "means for" are merely superfluous language.[71] To judge the validity of this assertion, the Court looks to the remainder of the claim to determine if it provides a sufficient

[71] Dr. Jayant opines in his written report that it is "*almost* as if the term 'means' was used casually." (Jayant Rep. ¶ 15 (emphasis added).) The Court, of course, must interpret terms based upon how they are actually used.

structural description of the decoding device, thereby rendering the "means for" language superfluous and ¶ 6 inapplicable. As Broadcom correctly notes, however, there is no structural language regarding the "means for decoding" in claim 6.[72] Thus, there is no indication from the claim that the words "means for" are meaningless. *Unidynamics*, 157 F.3d at 1319 (holding that term "spring means" was not sufficiently structural to overcome presumption in favor of ¶ 6); *Laitram*, 939 F.2d at 1535-36 (reversing district court holding that ¶ 6 did not apply where means term at issue did not set out structure of relevant device); *cf. Greenberg*, 91 F.3d at 1583 (rejecting contention that "detent means" and "detent mechanism" were synonyms subject to ¶ 6 because although patentee used "means" language loosely in specifications, claim itself did not use word "means").

Second, even if the Court were to find that the "means for decoding" and "decoder" were synonymous, such that dictionary definitions and other evidence regarding the term "decoder" could be used to interpret the term at issue, Agere would be required to demonstrate that "decoder" has a sufficient structural connotation to overcome the presumption in favor of ¶ 6. Agere has not met this burden, for Dr. Jayant only testified that "in general," decoders have one of three forms (Jayant Rep. ¶ 13) and a variety of different algorithms. (R. at 312-13 (May 7, 2004); *see also* Gibson Rep. at 3 ("There are an extraordinary number of means for decoding available and there is nothing in . . the term 'decoding' that would convey a decoder structure to one skilled in the art.").) Just as the fact that a device has multiple embodiments is insufficient to invoke ¶ 6 for a term that does not use the

[72] Dependent claim 7 sets out one particular structure for the "decoder" of claim 6. ('519 patent, col. 6, ll. 61-62 ("The device of claim 6 wherein the decoder is a [CELP] decoder.").) This arguably bolsters Agere's argument that "decoder" and "means for decoding" are synonymous, but it is irrelevant to the question of whether claim 6 itself sets out sufficient structure for the means for decoding.

word "means," *see Phillips*, 363 F.3d at 1212; *Personalized Media Communications*, 161 F.3d at 704; *Greenberg*, 91 F.3d at 1583; *see also supra* Part III.B.2, this same fact is insufficient to prevent the application of ¶ 6 where "means" is used. *See Wenger Mfg.,* 239 F.3d at 1232; *Unidynamics*, 157 F.3d at 1319; *Laitram*, 939 F.2d at 1535-36. In other words, a device that has multiple embodiments is rendered neither inherently "functional" nor inherently "structural" simply by virtue of its multiple forms, and the variety of possible physical embodiments alone therefore does not rebut the ¶ 6 presumption in either situation.[73] Accordingly, because Agere provides no evidence that the word "decoder" alone provides a sufficient structural description of a device that performs a decoding function, the Court rejects Agere's attempt to avoid the application of ¶ 6 and adopts the function and corresponding structure proposed by Broadcom, which do not appear to be in dispute.

2. "Means for postfiltering the decoded signal to generate the postfiltered signal" (Claim 6)

The dispute regarding this term is similar to that discussed above regarding "means for decoding," with Broadcom arguing for and Agere arguing against the application of ¶ 6. The crucial difference, however, is that claim 6 provides a partial structural description of the "postfilter." Specifically, the claim states that the patented device comprises "means for postfiltering . . ., the postfilter comprising a set of tunable parameters . . . having preselected values." The relevant question, therefore, is whether this "tunable parameter" language recites sufficient structure to perform the postfiltering function, thereby avoiding application of ¶ 6. *Micro Chem.*, 194 F.3d at

[73] By way of example, consider the term "screwdriver." There is more than one physical embodiment of the term (Phillips, flathead, etc.), but this fact alone does not render a screwdriver a "function"—it is merely a physical device with multiple manifestations. Similarly, if the term at issue were "means for driving screws," the fact that there are many physical structures that could be used to accomplish this function would not change the fact that the term itself is a function without a structure specified for performing that function, i.e., governed by ¶ 6.

1257. Agere's expert, Dr. Jayant, testified that the tunable parameters are a structural element of a postfilter, but he conceded that they are not the only such element. (R. at 312 (May 7, 2004).) Thus, it appears undisputed that these parameters, without more, are insufficient to perform postfiltering. Accordingly, claim 6 does not recite sufficient structural elements to overcome the burden in favor of applying ¶ 6.

The only other argument that Agere proposes to support its construction is that "means for postfiltering" is synonymous with the term "postfilter," which, in and of itself, has a structural connotation. This argument is supported by the claim language, quoted above, which appears to use these terms synonymously. Thus, assuming arguendo that the patentee intended the language in question to refer to a postfilter, the question becomes whether this is sufficient to overcome the presumption in favor of ¶ 6. As discussed above regarding "means for decoding," the fact that there are many possible embodiments of postfilters (Jayant Rep. ¶ 17; Gibson Rep. at 5), none of which are specified in the claim, signifies that the term "means for postfiltering" alone does not connote sufficient structure to perform the postfiltering function. Thus, the presumption that ¶ 6 applies is unrebutted, and the Court accordingly adopts Broadcom's proposed function and corresponding structure, to which Agere has raised no objection.

3. "$H(z) = (1 - \mu z^{-1}) \ldots$" (Claims 3, 8)

This dispute concerns whether the drafter of the patent erroneously and accidentally replaced a plus-sign with a minus-sign in claims 3 and 8. The applicable legal standard is that a court may correct typographical errors when: "(1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation." *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1354

(Fed. Cir. 2003) (reversing district court determination that claim text contained error where none of the proposed "corrections" of the error were "necessarily appropriate") (*citing I.T.S. Rubber Co. v. Essex Rubber Co.*, 272 U.S. 429 (1926)). Agere argues that the error here is not subject to reasonable debate because a person of ordinary skill in the art would understand that a postfilter must operate using the plus-sign formula, which describes a "smoother." (Jayant Rep. ¶ 25; *see also* R. at 328 (May 7, 2004) (stating that plus-sign formula corrects for high-frequency noise) (Jayant).) By contrast, the minus-sign formula describes a "differencer," which would never be used in a postfilter because it would have the opposite effect from what was intended. (Jayant Rep. ¶ 25; *see also* R. at 328 (May 7, 2004) (stating that minus-sign formula corrects for muffling) (Jayant).) Broadcom argues that there is reasonable debate about the error because: (a) the minus-sign formula is used twice in the claim text; and (b) the minus-sign function is commonly used in articles related to postfilters, including an article cited by the '519 patent. (Gibson Rep. at 5-6.)

Pursuant to the Federal Circuit's direction, the Court looks first to the claim language and specifications to determine whether the correction is "subject to reasonable debate." *Novo Indus.*, 350 F.3d at 1354. Within the '519 patent, the minus-sign formula is used twice, in claims 3 and 8, and the plus-sign formula is also used twice, once in claim 13 and once in the specifications at col. 5, ll. 30-35. All four times, the introductory language is identical: "the short-term postfilter has a transfer function of . . ."[74] Thus, there being no facial differentiation between these transfer functions (and the parties have not raised any argument that they are substantively different), it appears that all four formulae should have been the same.

[74] Interestingly, in the two places where the minus-sign appears, the claim text also omits the hyphen in "short-term postfilter." ('519 patent, col. 6, l. 28, col. 7, l. 14.) This may be a further indication that the drafter of the final claim text was less than precise in his or her drafting.

Regarding which sign is appropriate, Dr. Jayant testified that only a plus-sign formula would have the "smoothing" effect that the postfilter is designed to have. (Jayant Rep. ¶ 25.) Dr. Gibson does not directly dispute this point, but argues instead that a minus-sign formula might function properly if the sign of the μ were reversed. (Gibson Rep. at 6.) In effect, therefore, Broadcom argues that the minus-sign is correct because the patentee twice reversed the sign of the μ *sub silentio*. The Court finds this tacit sign-changing theory implausible, especially in light of the fact that all four appearances of the formula are followed by the exact same definition of μ ("$\mu = \gamma_3\kappa_1$"). At no point does the patent make any distinction whatsoever between the four formulae in question to indicate that the sign of μ, γ, or κ differs in the various portions of the patent. In total, therefore, the Court credits Dr. Jayant's testimony that the patentee intended to use the plus-sign throughout the patent and finds that there is no reasonable debate that the claim text and specifications show the minus-sign formulae in claims 3 and 8 to be accidental.

The prosecution history "does not suggest a different interpretation." As Agere notes, the original application used the plus-sign formula in all four of the relevant locations. The minus-sign was introduced in an amendment that substantially revamped the application, canceling at least twelve claims, introducing a number of others, and rewording portions of the remainder. (Agere Opening Ex. 39 (Preliminary Amendment, June 17, 1994).) The amendment explains most of its changes to what became claims 3 and 8 in a fairly lengthy "remarks" section, but it makes no mention of any changes to the formulae at issue. In addition, the portions of the original application that were not affected by the amendment included both of the plus-sign formulae that carried over into the final patent. Thus, it appears that the author of the amendment inadvertently altered some of the formulae, for it is difficult to conceive of an amendment that changes two of four identical

terms in a fundamental fashion without making any note whatsoever as to the rationale behind such changes, especially where it appears that all other changes are thoroughly explained. Accordingly, the Court finds that both of the *Novo Industries/Essex* factors are satisfied, and the term at issue should be construed as "$(1 + \mu z^{-1})$."

V. CONCLUSION

For the reasons stated above, the claim terms at issue shall be construed as set out in the following Order.[75]

[75] The Court wishes to thank counsel for both parties for their diligence, professionalism, and courtesy. The claim construction process has not been easy for anyone involved, but it was rendered considerably more bearable by counsel's extremely able representation throughout. I also wish to thank my law clerks who worked on this case. We were all faced with the difficult task of comprehending complex technology, and they were invaluable to me.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

AGERE SYSTEMS, INC.,	:	
Plaintiff,	:	**CIVIL ACTION**
	:	
v.	:	
	:	
BROADCOM CORPORATION	:	**No. 03-3138**
Defendant.	:	

ORDER

AND NOW, this **20th** day of **July, 2004**, it is hereby **ORDERED** that:

1. The following claim constructions are adopted:

PATENT	TERM	CONSTRUCTION
'559	"Grounded"	Connected to ground.
'559	"Different"	Tuned to a frequency that is outside the operating frequency of the [first/second] antenna.
'550	"Feedback signal"	An actual electronic signal constituting information about the communication environment which allows an originating source to adapt in response to that information.
'550	"Receiving an OFDM signal that includes OFDM symbols" and "generating a feedback signal based on said OFDM signal"	The receiver generates a feedback signal by evaluating a received OFDM signal.
'550	"Receiving [receives] a feedback signal from a receiver"	A transmitting device receives a feedback signal from a receiving device.
'550	"Adaptively selecting one of a plurality of operating parameter scaling options"	Making a selection from among a set of options, each of which has different values for one or more operating parameters.

'550	"Determining that an operating characteristic of said method should be scaled from a first level to a second level based on said feedback signal received from said receiver"	Deciding whether an operating characteristic should be scaled from a first level to a second level based on the feedback signal from the receiver.
'550	"Generating a feedback signal based on said OFDM signal and providing said feedback signal to dynamic control circuitry that determines whether an operating characteristic of OFDM symbols should be changed based on said feedback signal"	The receiver generates a feedback signal based on a received OFDM signal and provides that feedback signal to control circuitry that decides whether at least one of the operating characteristics should be changed during operation based on that feedback signal.
'550	"Said system comprising dynamic control circuitry which receives a feedback signal from a receiver, determines whether an operating characteristic of said method should be scaled from a first level to a second level based on said feedback signal."	The transmitting device comprises control circuitry that receives a feedback signal from a receiving device and decides whether an operating characteristic should be scaled during operation from a first level to a second level based on that feedback signal.
'786	"Information-carrying symbol(s)"	Symbol(s) containing data, but not preamble symbols.
'786	"Signaling modes"	One of a plurality of OFDM transmission modes.
'786	"Prefix and window circuit"	A circuit that copies the last part of the OFDM symbol and augments the OFDM symbol by prefixing it with the copied portion of the OFDM symbol, and which also applies a pattern to the amplitude of the OFDM symbol at the beginning and end of the symbol.

'786	"Windowing function"	Applying a pattern to the amplitude of the OFDM symbol at the beginning and the end of the symbol.
'786	"Portable terminal"	[No construction necessary.]
'705	"Communication module"	A self-contained assembly of electronic components and circuitry used for the transmission or reception of information. A communication module cannot function independently.
'705	"Module processor" and "Module memory"	[No construction necessary.]
'705	"Transceiver"	Transmitting and receiving equipment in a common housing, usually for portable or mobile use, and employing common circuit components for both transmitting and receiving.
'705	"Selected"	[No construction necessary.]
'705	"Lower layers"	The layers below a dividing line in a layered protocol model.
'705	"Lowest layer"	The bottom-most layer in a layered protocol model.
'705	"Instructions"	Any executable statement in a computer program.
'311, '366	"Bridging node"	A non-terminal node that relays messages in an interconnected network.
'311	"Access point"	[No construction given.][76]
'311, '366	"Beacon"	A signal sent at predetermined intervals.
'311, '366	"Predetermined"	[No construction necessary.]
'311, '366, '771	"Roaming terminal/device"	A terminal/device that is free from cable connections and designed to be able to be moved while receiving or transmitting signals.

[76] No later than **July 26, 2004**, the parties *may* file supplemental briefs regarding the construction of this term, including new or revised proposed constructions. Each brief shall be limited to five pages in length, excluding exhibits, and no responses shall be filed.

'311, '366	"Immediately"	With no delays except for those delays inherent in wireless communication.
'311, '366, '771	"Transceiver"	An instrument combining a radio transmitter and a radio receiver.
'771	"Base station"	An element in a network that repeats data messages and provides access to the infrastructure.
'771	"Data collection system"	A system that collects data. This does not include radio pagers.
'771	"Pending message list"	A list that indicates to a terminal whether it has a message pending.
'771	"Selectively deactivating"	Making inactive by choice.
'802	"Voltage clamping means"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to clamp voltage. The corresponding structures are shown as elements 15 and 16 in figures 1 and 3 and in the text at col. 2, ll. 5-6, col. 2, l. 65-col. 3, l.12, and col. 4, ll. 65-67.
'802	"Output buffer having a p-channel transistor and an n-channel transistor"	[No construction necessary.]
'817	"Bandgap voltage supply circuit"	A circuit that provides a reference bandgap voltage and has virtually no power supply rejection.
'817	"Amplifier circuit"	A circuit that receives the voltage from the first output of the bandgap voltage supply circuit and provides an amplified signal in response thereto.
'817	"Voltage Regulator"	Apparatus that controls the voltage supplied to the input of the bandgap voltage supply circuit by the power source so as to maintain the output bandgap voltage between 1.0 and 1.5 volts.
'782	"Means for supplying output current"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to supply output current in the current paths of the output transistors. The corresponding structure is the output node (I_{OUT}) and the connection or lead that supplies the output current in the output current path.

'782	"Means for supplying an input current in the conduction paths"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to supply an input current in the current paths of the input transistors. The corresponding structures are current sources connected to the conduction paths.
'782	"Devices for which the conduction path current is substantially proportional to the square of the minimum required voltage along the conduction path for operation in the saturated mode"	The devices operate in saturated mode and satisfy the relationship expressed as I_D is substantially proportional to: $W/L * (V_{GS} - V_T)^2$ in that mode of operation.
'195	"Tank circuitry comprising at least one inductor and capacitors connected to said source and drain electrodes"	A circuit comprising at least one inductor and capacitors, capable of storing electric energy over a band of frequencies continuously distributed about a single frequency at which the circuit is said to be resonant, wherein said capacitors are connected to the source and drain electrodes of a pair of MOS devices.
'195	"Means directly connecting"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to directly cross-connect the drain and gate electrodes of the two MOS devices. The corresponding structures are the low-impedance paths between the gate and drain electrodes disclosed at col. 2, ll. 36-42, and shown in Figures 1 and 2.
'195	"Power sources"	A power source can be a voltage supply or ground potential.
'195	"Reactive element"	A device that behaves like an inductor or a capacitor.

'195	"Means including additional reactive elements for connecting the source and drain electrodes . . . to associated power sources"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to connect the source electrodes of a pair of MOS devices to an associated power source and to connect the drain electrodes of those MOS devices to a different power source. The corresponding structures in the specifications are the low-impedance paths that include additional reactive elements, such elements being devices that behave like inductors or capacitors. The corresponding structures are disclosed in figure 1 and at col. 2, ll. 44-48.[77]
'432	"DC-isolated variable capacitor"	A variable capacitor or equivalent capacitor circuit whose capacitance is unaffected by any DC voltage or current at an input or output node of the DC-isolated variable capacitor.
'432	"Buffer amplifier"	A device or circuit that has an output impedance greater than the impedances of the other circuit elements connected to its output and that provides isolation between its input and output.
'194	"Current-controlled complementary metal oxide semiconductor C3MOS logic"	Digital logic circuitry based on current steering circuit techniques and fabricated using CMOS processes.
'194	"Current steering"	Directing a substantially constant current flow into one of two or more branches in response to differential input signals.
'194	"Serialize"	Form a digital output signal from multiple streams of data.
'194	"First circuitry"	Digital circuit section that is configured to (I) process a first signal having a first frequency and (ii) serialize the second plurality of signals into a single output signal, the logic of such circuitry being entirely C^3MOS logic.

[77] No later than **July 26, 2004**, the parties shall jointly inform the Court whether, in light of the above constructions, there are any additional structures corresponding to the "means including" term.

'194	"Second circuitry"	Digital circuit section that is configured to process a plurality of second signals having a second frequency that is lower than the first frequency, the logic of such circuitry being entirely CMOS logic.
'194	"The second circuitry being coupled to the first circuitry"	The second circuitry is connected to the first circuitry such that it receives the plurality of lower-frequency second signals from the first circuitry, and provides a plurality of lower-frequency processed signals to the first circuitry.
'194	"Conventional complementary metal-oxide semiconductor (CMOS) logic"	Logic circuitry formed using complementary CMOS transistors (i.e., – and p-channel transistors).
'194	"Substantially zero static current"	Very low static current.
'154	"Trellis encoding ones of the aggregated bits to identify, for each of the plurality of symbols, a respective subset from which that symbol is to be chosen"	This term does not have a customary meaning to a person of ordinary skill in the art. This term is not limited to successive identification of symbol subsets for each set of aggregated bits.[78]
'154	"Choosing each of the plurality of symbols from their respective subsets jointly as a function of at least a particular group of the others of the aggregated bits"	Symbols are jointly, or interdependently, identified from their respective subsets by a particular group of non–trellis-encoded bits.

[78] No later than **July 26, 2004**, the parties shall inform the Court of whether there is a mutually-agreeable construction of this term that would be of use to the trier-of-fact and that is in concert with the Court's holdings. If no such construction is agreed upon, the parties *may* include discussion of this term in the supplemental briefs filed regarding the "access point" term. The page limit noted above shall in any event remain unchanged, and no responses shall be filed.

'154	"Identifying signal points from successive ones of the identified 2M-dimensional subsets jointly in response to at least a particular group of the others of the input bits"	Signal points are jointly, or interdependently, identified from their respective subsets by a particular group of input bits.
'154	"Fractional bit rate relative to the symbol rate"	Non-integral number of information bits per 2N-dimensional symbol.
'551	"Input data"	Information received from an external source.
'551	"Encoding a second portion of said input data"	Encoding a portion of the input data that is not encoded using the first redundancy code.
'519	"Means for decoding the encoded signal to generate a decoded signal"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to decode an encoded signal to generate a decoded signal. The corresponding structures in the specifications are disclosed in Figure 1B (except postfilter) and Figure 3 (except postfilter).
'519	"Means for postfiltering the decoded signal to generate the postfiltered signal"	This is a means-plus-function term governed by § 112 ¶ 6. The function is to postfilter an encoded signal to generate a postfiltered signal. The corresponding structures in the specifications are disclosed in Fig. 7 and at col. 5, ll. 9-56.
'519	"$H(z) = (1 - \mu z^{-1})$"	$H(z) = (1 + \mu z^{-1})$

2. By stipulation of the parties, the Court's Scheduling Order of August 14, 2003, is amended as follows:

   a. Any motions for summary judgment shall be filed by **September 7, 2004**.

   b. Responses to any motions for summary judgment shall be filed by **September 27, 2004**.

c. In all other respects, the Scheduling Order of August 14, 2003, as previously amended, shall remain in effect.

BY THE COURT:

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Berle M. Schiller, J.